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Quarterly

AIR FORCE ENGINEERING AND SERVICES

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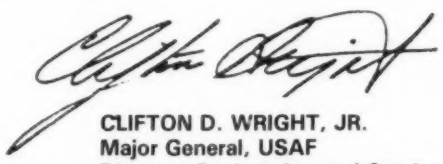
In this issue:

- E&S enters the computer age.
- Interview with the Director
- Resource Management

From the Director

During the last decade, our society has become increasingly service oriented, and this attitude is reflected by our customers in the Air Force. I am convinced that we are doing our job better than ever before, and yet the demands on us for more and better service are ever increasing. We can't expect large increases in resources to meet these demands, and thus we must improve our ability to manage the resources we have — manpower, money and materials. We must do it at all levels, but most importantly at base level. We're working many issues directed toward improving the way we do our business, but — in my judgement — the most significant one is our initiative to obtain mini-computer systems that will place at our fingertips the very latest equipment the industry has to offer. My objective is to give key managers the ability to fully automate — in the format they choose — the data required to do their jobs. Full automation means that every one of our managers, from production control to the billeting office, will have almost instant access to current information regarding any task at hand. It means that a mini-computer terminal will become as common a tool as a pencil. It means that we will have the real-time flow of information that is the lifeblood of management in making the myriad of daily decisions concerning the control and use of resources. It means that our managers will have more time to manage for the future since they will spend less time accounting for the present or the past. Today's mini computers are powerful, relatively inexpensive and — most importantly — easy to use. Those of us who have been skeptical of computers need no longer be so. I recognize that we need this capability and have directed that we embark on a comprehensive program to define requirements and get the equipment on board as quickly as possible. The lead articles in this issue describe our plans for full data automation. I urge you to read them carefully and begin to orient your thinking towards a new way of doing business — a new era in Engineering and Services.



CLIFTON D. WRIGHT, JR.
Major General, USAF
Director, Engineering and Services

The computer is the tool of management; the single greatest advance in nearly four decades. This is a new era.

engineering & services

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FEATURES

4 • **An Interview with the Director**
8 • **Doing More with Less**
12 • **Information — The Key to Resource Management**
18 • **Engineered Performance Standards: A Management Tool**
20 • **The Vehicle Big Picture**
27 • **The Industrial Engineer as a Change Agent**
31 • **Resource Recovery at Pease**
33 • **Feeding the Basic Needs**
36 • **ECOP**

DEPARTMENTS

16 • **ESQ World**
29 • **CESMETtips**
30 • **Current Emphasis**
39 • **tecnotes**

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- Attract highly qualified personnel to the Air Force Civil Engineering and Services career fields
- Promote effective training, education, and retention
- Communicate vital concepts, policies and practices which affect the wartime readiness of the United States Air Force.
- Promote professionalism, and devotion to duty.
- Stimulate planning for the wartime survival of our personnel, weapons systems and facilities.
- Develop Air Force stewardship of the well-being, quality of life and facilities support to Air Force personnel and their families throughout the world
- Promote awareness of the efficient, effective and essential facilities needs of the Air Force.
- Transfer knowledge of Air Force Engineering and Services' technical and scientific achievements.
- Promulgate teamwork among the Air Force Engineering and Services' total force.
- Achieve a professional dialogue to enhance the thought, development and contributions of the Engineering and Services team worldwide.

The **Quarterly** editorial offices are at HQ Air Force Engineering and Services Center, Tyndall AFB, Fla. Contributions, suggestions and criticism are welcome. Opinions expressed do not necessarily reflect the official viewpoint of the Department of the Air Force, the Director of Engineering and Services or the editorial staff. Authority to publish this periodical automatically expires in January 1984 unless its continuance is authorized by the approving authority prior to that date. The use of a name of any specific commercial product, commodity or service in this publication does not imply endorsement by the Air Force.

An interview with
Maj. Gen. Clifton D. Wright, Jr.

Making the system work

by H. Perry Sullivan, Jr.

ESQ: The contributions of Engineering and Services for the first time are outlined in the Air War College text, "Managing the Air Force." What do you think the impact of this will be?

GENERAL WRIGHT: The most positive impact will he helping future leaders understand what we do and how our work contributes directly to the combat mission. We have needed an Engineering and Services section in this document for a long time. We are educating the future leadership of the Air Force at AWC — whether the students take the course by correspondence, seminar or in residence. I also believe in personal participation any time I get a chance at Maxwell or at the Base Commanders' course at Wright-Patterson at the "school house." We need to talk to our current and future leaders and listen to them as well. We also need our mission spelled out in course materials. We have been a part of the Air Command and Staff College program for a long time but are putting more emphasis there now. It is important that students at both the Command and Staff and the War College know what we do at all levels of command — it makes them more effective officers. What we do to support the mission and the people of the Air Force and their families must be conveyed at all levels.

ESQ: Because of recent adverse conditions affecting the job market, some people have said that the recruiting problems for the Air Force appear to be over, at least temporarily. Do you feel that this true for Engineering and Services?

GENERAL WRIGHT: We've been enjoying a buyers market but it won't always be that way. The job market reflects the economy and there are indications that things are improving. Conditions in the market place can change rapidly. Today, when I travel to the bases and meet our people and see them at work, I feel that our emphasis on quality is paying off. We now have on board the

finest force ever to serve in Engineering and Services. We should be working to insure that our standards are high, and that we work hard to retain the people we now have. At the same time, high potential individuals outside the Air Force who may be interested in or qualify for any of the E&S career fields — either professional or technical — should be made aware that we offer outstanding opportunities.

ESQ: Just how personally involved should our people be on the recruiting scene?...in contacts with Recruiters?...at the vocational and technical schools?...at the colleges and universities?

GENERAL WRIGHT: We need to be sensitive to the needs of the Air Force, now and in the future — all of us. We know that the Air Force is a great way of life because it's the life that we live. We should be telling that story. We should be out there helping the Recruiters and visiting ROTC detachments on the campus. There are many ways — science fairs, job fairs, career days and orientations in which we can participate. We can go back to the campus and talk to student groups. When I was the commander of the Center, we opened up communications with Florida State University. They offer a tremendous program in hotel and restaurant administration. We started a design program with architectural students at Clemson University. We've had them working real world design problems for the Air Force. This helps students at colleges and universities understand what we do in the Air Force and how important our work is. The Society of American Military Engineers does an outstanding job supporting students posts at colleges and universities. We should work actively within this society and others to sponsor and support student organizations. In many ways the best support we can give Recruiters is by being active in the community where we live, by being advocates of the Air Force when we are visiting back home, and by being active on the campus. When we interest an intelligent, capable and acceptable young person in joining us, we are molding and building the future of Engineering and Services. We are choosing and shaping the kind of force that's needed in the Year 2000 and beyond.

ESQ: In a recent issue of the Quarterly we discussed the subject of design excellence in the context of the first Air Force symposium on design held at the Academy last June. Do you feel that the Air Force can stimulate cost effective excellence in design through the agents and the contract community?

GENERAL WRIGHT: Excellence in design is cost effective. First, let me point out that good design costs no more than poor design. If you look around the Air Force today, you'll see that we're getting a level of excellence that we never achieved before. We are communicating to the agents — the

Corps of Engineers, the Navy, and our own people responsible for design — that we must strive for the best. Air Force leadership supports our efforts. A real challenge is to stimulate good design at base level. This is the opportunity to give our young architects an opportunity to apply their talents. We should think "excellence" on even the smallest projects. If we really do an outstanding job, we get the people who occupy a building to invest in it their own sense of pride and purpose. Our buildings are occupied and used by people who are willing to invest a part of themselves in order to preserve and maintain appearance and condition. When I talk about design excellence, I'm also talking about design that takes into account operations and maintenance costs over the long run. This includes the roofing system, passive and active means to conserve energy, efficient heating, ventilation and air conditioning systems as well as distinctive and pleasing interiors and exteriors. Good design means caring for the occupant — interior decor and furnishings, safety and environmental considerations to name a few. In essence it means engineers and architects working together, designing and constructing buildings that are functionally efficient, esthetically pleasing and easy to maintain.

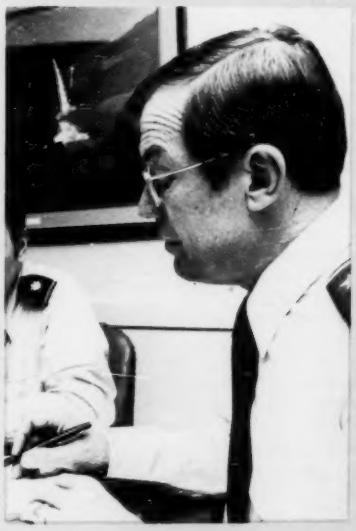
ESQ: As funding levels make it possible to build some facilities, get older facilities up to standards and attack the repair backlogs, we have no more people to do the job. How do you feel about the response of the E&S team toward getting the job done?

GENERAL WRIGHT: We seem to work better under adverse conditions. We work harder, and we get smarter. We have been doing a good job of planning and programming but we must do better. I still encounter too many situations where after a project is programmed, designed and funded, we find problems with requirements, scope or criteria that cause unnecessary cost overruns. Good planning and programming up front is only a part of the challenge. Follow-up is required. We must stay on top of our programs, anticipate problems — act rather than react. We won't always have abundant resources. In the O&M area, Fiscal Year '82 was a very good year. The current year may not be as good but we don't know yet. We should press on assuming that we will receive at least the same amount of O&M dollars for projects. We're working FY '84 now and so far it looks good. We must get into the Programs Objectives Memorandum those things that we want and need. As Brig. Gen. "Bud" Ahearn says, "If it ain't in the POM, it ain't in the budget." The POM is built along the lines of the national, DOD and Air Force objectives as they apply to each major command. Along those lines, we all must understand that what starts out at base level must be tied to and become a part of major command programs. As you said, we don't have more people, but the people we do have are outstanding. They have really done an exceptional job of identifying requirements. We know, for the first time ever, the magnitude of our backlog, both in the new construction and the maintenance and repair areas. Now we must discipline the system and work the program methodically and effectively.

ESQ: Air Force Engineering and Services has the unique distinction of functioning as an advocate for the field forces in establishing the E&S training and education requirements. Do you feel that this advocacy has resulted in meaningful change benefitting the field-level people?

GENERAL WRIGHT: There is no doubt that our direct involvement in the training and education process has greatly enhanced the ability of our field-level organizations to do their jobs. Our annual Program Review Committee meetings at both AFIT and the tech training centers are very effective and serve us well in terms of communicating requirements to the Air Training Command. We first determine requirements based on the needs of every major command and other users. Then, we come to ATC. At AFIT, for example, our professional-level short courses are based on inputs from a variety of people and organizations in the field, the E&S Center, and from the R&D arena. The people at AFIT and at the tech training centers are really our own. They have a tremendous interest in the career fields. We have our best people teaching and instructing throughout the system. ATC works hard to accommodate the needs of Engineering and Services and we provide assistance wherever possible. People come in from the field to help establish course outlines, review training material, and we even work to get training aids to the experts in the TTCs, who take actual field-level hardware and construct classroom mockups and hands-on training devices. We also benefit greatly from the Air University's in-residence educational programs, at the graduate and undergraduate levels. We have been building a strong relationship for years, and we're making it stronger every day.

ESQ: You are known as a strong advocate



of both continuing education and professionalism, meaning both PME and membership and registration in professional societies and organizations. What do you say to the person who is trying hard to achieve both, and sometimes feels some pressure in their life and professional career?

GENERAL WRIGHT: There is no question that our personal and career priorities must be balanced — each is important in its own right. I don't know anything more important than "professionalism." If we are going to call ourselves professionals, we should seek the appropriate recognition and accreditation. At the present time we are not required to obtain professional registration, but I'm working to make it a prerequisite for certain positions. It should be a matter of personal pride as well as a job prerequisite. We deal daily with professionals. We work "across the table" from people who are working professionals. Let me make a point on the purpose of registration. There are legal requirements establishing who must be licensed to provide certain kinds of professional services. That means the people who are certified or registered must pass stringent examinations to prove their ability. We in the government sector must work hard to do the same. Even though not required by law, it makes a difference in the quality of work we produce. We are constantly judged by people who share our background, education and sense of duty. Interest in professional registration also causes us to continue the education process. It insures recency of exposure to the processes of one's particular profession. Twenty years downstream, as a working professional in or out of the Air Force, you will find that the time and effort invested today will be of great value. I also strongly recommend that we maintain currency by reading professional journals. We get far more in return for our investment than we could ever imagine. I personally read the Engineering News Record, the AIA Journal, the Military Engineer, and the E&S Quarterly. If we don't make an effort to keep up, we'll be left in the dust before we know it. Professional registration, our Air Force technical training and professinal education process, and professional military education are all essential. The latter provides us with the purpose and the doctrine, the philosophy and heritage. It is up to each of us to apply our professional and technical capabilities to making the Air Force an effective instrument of national policy. That's difficult to do if you can't relate one to the other.

ESQ. Earlier in your career, you were associated with one of the first meaningful mergers of Engineering and Services at the operational level. Do you feel that the sense of cooperation and teamwork should extend below the level of the major commands and separate operating agencies?

GENERAL WRIGHT: I certainly believe that the Base Civil Engineer and the Base Services Officer should cooperate and work together. However, I don't feel that the consolidation should extend below the MAJCOM. The BCE has his hands full. The Base Services Officer has his or her hands full, also. They must both answer to the wing commander. I was in USAFE in 1972 when we consolidated Engineering and Services for the first time in the Air Force. It is difficult for people to understand our objectives. Simply stated, there was a need to focus one staff agency on those areas that contributed most to the living and working environment. Very few people really understood or appreciated Services. The significance of this vital part of the Air Force mission was grossly underestimated. We needed to bring together the people who planned, built and maintained facilities, and the people who play a large role in supporting our people and their families. Eventually AFCOMS was formed and the old Air Force Services Office at Philidelphia brought into the Center. The rest is history and the record speaks for itself. We've got consolidation at the top . Let's leave it as its is at base level — it's working well.

ESQ: Another facet of this earlier time in your life was your association with the concept, "Quality of Life." Do you feel the E&S contribution of quality of life will continue with the same priority and intensity?

GENERAL WRIGHT: If anything, we are pursuing quality of life issues with greater intensity. Many functional managers have a responsibility here but we're the prime mover, the keystone, because so much of what we do and are responsible for is tangible and visible, — the built environment and daily subsistence are probably two of the most important. Much of the responsibility for the support of people is assigned to Engineering and Services. It's easy to talk quality of life. We put our money on the progams that make things happen. That includes a lot of things — housing, both our family housing programs and dormitories; recreation, hobby and community centers; dining halls; the non-appropriated activities including commissaries and exchanges; and even a heavy involvement in better health care facilities.

ESQ: In your second "From the Director" in the ***Quarterly***, you paid tribute to the Non-Commissioned Officers of Engineering and Services. Do you feel that the E&S NCO community gets appropriate recognition among the people and organizations that we support?

GENERAL WRIGHT: Civil Engineering and

Services NCOs are more visible on a base than any other group. They're out front every day — on the firing line. For instance, in a tactical reconnaissance wing, a civil engineering NCO does things that directly impact the base and wing commander as well as the tactical squadron commanders. They make things happen — build things, make the base tick. In services, our NCOs are responding to all kinds of challenges, making sure that everyone is taken care of, running a motel, managing dorms or leading an honor guard. The food service NCO may get a bit of praise during the Hennessey Trophy competition, but one thing learned quickly is that quality food service is a challenge every day. There are some hazards to being up front but we handle that with care. On the other hand, we develop a highly capable NCO. A lot of our people get selected for honors. The first Senior Enlisted Advisor of the Air Force, Chief Master Sergeant Paul Airey, came from the Civil Engineering Squadron at Tyndall AFB. We have had some absolutely superb NCOs in the past; today, I think they're getting even better. But, with a quality force comes the challenge of recognizing and rewarding our people. We must be ready to point out excellence and stand behind our people.

ESQ: Some of our people at field level feel that there is a tremendous challenge to maintain a level of readiness training for the uniformed force, while still getting the job done and answering the daily mission needs. How do you react to these feelings?

GENERAL WRIGHT: Survival in the trenches at base level means supporting the commander — that is first and foremost. But, we must train our people to be ready for the wartime mission. We have to take time out to practice the fundamentals of doing our job in wartime, and we must learn and become familiar with the equipment we use in wartime. Managers must know that part of their job is training. Whether we realize it or not we are training young people for wartime everyday. When we deploy, often times we're on our own. Our entire mode of

operations, our philosophy and our thinking must be able to handle the transition from peace to war. It may appear inefficient seeing one highly skilled civilian or military technician working with two of our young airmen on a job that should only take one person. We are training those two airmen to do a job. It is important that others understand what we're doing. It is also important that we practice that concept, that idea of training while doing in our daily tasks. When Prime BEEF or Prime RIBS deploy, they must be ready to hit the ground running. They must be able to execute their assigned tasks.

ESQ: Sometimes there has been the perception that the Reserve Forces compete with the active uniformed contingent for manpower authorizations and money. How do you feel about the role of the unit organized and individual mobilization augmentees' contributions to the E&S mission?

GENERAL WRIGHT: If there is any competition, it is in the sense that all of government competes for a share of the budget. Even there, competition is healthy. The Reserve forces are extremely important to us. The Guard and the Reserves are an integral part of our total force structure in Engineering and Services. They constitute a large part of our mobilized wartime force. The benefits go far beyond that basic concept. First of all, there are economies in recruiting, retention and training. Secondly, we have a mechanism, a system for utilizing the vast reservoir of skill and talent that would otherwise not be available to us in the private sector. In fact, the level of skills and capabilities in our Guard and Reserve units is very high. The Individual Mobilization Augmentees offer us tremendous opportunity to augment our staffs with the skills and professionalism we need to carry out our wartime role. We have developed a handbook for people who manage IMAs. It is to be used by everyone across the Air Force with IMAs assigned as a part of the team. IMAs are not just visitors who come in for a periodic visit. They are a part of the mainstream. And, they bring with them a wealth of talent and skill.

ESQ: There is a growing awareness in the policy and planning process that the civilian population currently in E&S will constitute the continuity of operations force for our CONUS facilities in the wartime contingency scenario. Do you feel that the civilian force itself is aware of its tremendous importance in the contingency situation?

GENERAL WRIGHT: I don't think we have communicated adequately to our civilians the significance of their wartime role. Our civilians are dedicated and capable. We must communicate across the Air Force that they are as vital to carrying out the mission during contingencies, and sustaining the capabilities of our CONUS bases as our bluesuiters. There must be a balance of forces. We will still have some military personnel staying back. But at the same time, we can't stick our head in the sand. How many go and how many stay? You can't carry on idefinitely with skeleton forces. It's difficult to precisely determine the numbers because the mission of each and every CONUS base during wartime isn't always clear. I am convinced we'll be working in an intense, dynamic environment. We will be speeding up construction projects to complete them and we'll surely have to initiate new construction, do a lot of alternation work and be able to absorb the additional people who will be coming on board. There will also be a tremendous impact on the communities around our bases. We must inform, communicate and educate.

ESQ: Our E&S civilian managers now have a career management program which provides many positive features — both for the military manager and the employee. Do you encourage your current and future civilian managers to participate in the program?

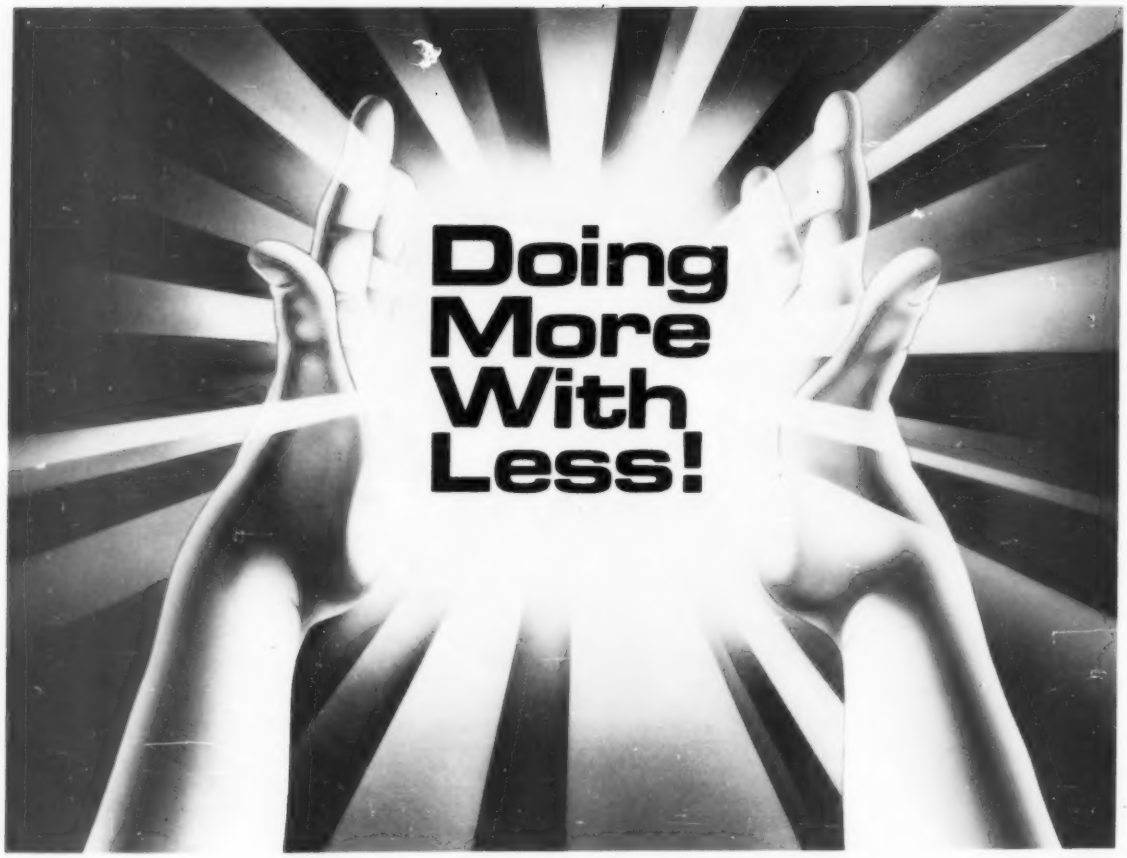
GENERAL WRIGHT: Yes. We have been carrying out an intensive information and orientation program to obtain maximum participation. Chuck Johnson, our Engineering Civilian Career Management Program manager at the Office of Civilian Personnel Operations, has visited some 40-50 bases to meet with our civilian professionals, talk with them, and answer their questions. Initially, there was a great reluctance on the part of many civilian managers. I sent everyone a letter outlining just how important the program is to each. I received only one letter that was in any way negative out of some 2,000 distributed. That person received a personal letter from me further explaining the purpose of the program. The concern among those interested in job progression is first having a program to relate to. We now have that. Our program offers a clear path to progress for those interested in moving up the organizational ladder. We also need to be able to identify the outstanding civilians who will be available to move into the positions of leadership.

ESQ: The resource management challenge facing the E&S team includes not only people and money, but equipment and supplies. Is there a need for our people to become more aware of the systems acquisition process and the logistics support system?

GENERAL WRIGHT: A good manager learns as much as he can about the organizations supporting him. There is always the case of somebody in the field wanting a new vehicle, but he doesn't know who to talk to. Trying to get a new piece of equipment can be a frustrating experience for people who don't understand the acquisition process or how it works. It takes a lot of education and a lot of communicating, on both sides of the family. For us, equipment — including vehicles — is our life blood. We can't do our job without them. On the other hand, the folks over on the Supply and Transportation sides of the house have a complex process to deal with. Our people need to understand more about how the equipment and vehicle replacement systems work, and that understanding and involvement is critical at the base level. We need our Base Civil Engineers and Chiefs of Services to get personally involved. Let's take vehicles. If you don't have enough, if what you have is too old, if there are technical problems, you've got to go to the Vehicle Authorization and Utilization Board and scrap for what you need. We've got a lot of old vehicles. There are not enough new vehicles to meet the requirements. You're going to have to learn the process and get in there and fight. This is what I mean by being sensitive to what is going on around you. You have got to avoid the in-box syndrome and be aggressive. You must know what's going on and what affects you. We are making adjustments in the way that we acquire equipment and work with the people over in Air Force Logistics Command but we still need intense interest at base level.

ESQ: You have been a part of the E&S leadership at Directorate level since you assumed command of the Center and served dually as the Deputy Director. Now that you have succeeded to the Directorship, what do you perceive as the major challenges facing our worldwide E&S forces for the coming year?

GENERAL WRIGHT: I feel that the last point applies to this question. We are competing for resources. And we must be sensitive to what is going on around us. We have a good climate now. We are enjoying the best real property maintenance program ever. Our Military Construction program is the largest in history — $3.2 billion at the Congress right now. Our family housing is looking good for the first time in years. We have made a tremendous and progressive series of moves toward answering the needs of the Air Force for the near term and into the future. Executing these programs in a responsible, professional manner is essential. We must continue to do a good job planning, programming and designing. We must look at our energy programs — energy is money — and make energy work for us. We're very fortunate in Engineering and Services to have the caliber of people that we have in our active and reserve force, and on the civilian side of our family. We are making the system work.



by Maj. Theodore M. Golondzinier

Doing more with less is a slogan we hear each year. Each year Engineering and Services has responded to that call. Over the years we have streamlined our management procedures, developed more cost effective tools, upgraded our training programs and contracted out various functions, all in the hopes of doing more with less. The Engineering and Services managers are now stretched in trying to get more performance out of their organizations. We are fortunate that computer technology has also been responding to the call of doing more with less because to give the full application of this technology will give relief to managers. To give you an idea of the advancement of computer technology in recent years, a comparison will be made with the automobile industry. If the automobile industry experienced the same rapid advancement in technology as the computer industry, a Lincoln Continental, Mark IV, would cost only 45 cents and would get 16 million miles to a gallon of gasoline. It is also projected that by 1990 computer chip technology will advance to the point where the 20 million books in the Library of Congress, that is, about 70 trillion bits of computer storage, will be reduced to a bucket full of chips.

Because MAJCOM/DE's voiced a strong concern that our current automated systems were not providing the information base level managers required, a two-year information requirements study was commissioned in May 1980. Engineering and Services senior management made a commitment to tap the rapid advancements in computer technology and use it to its fullest extent to insure continued mission responsiveness in an environment of ever reducing resources and changing requirements. In this article, we want to look at how this new technology will impact Engineering and Services resource management.

The Information Requirements Study (IRS), commissioned by Maj. Gen. William Gilbert (Ret.) in 1980, started the process of determining our information requirements and tying them together to create an integrated information management system. According to the IRS, a system was needed which would not only speed the flow of information throughout the Engineering and Services organization but also reduce the manual information processing required by the base civil engineer and base services officer. Through the IRS a long range data automation plan was developed which projects information management requirements into the 1990's.

Figure 1 is a generalized picture of the automated information flow within the Engineering and Services fuctional areas. Each block in the figure represents one or more computer systems and the arrows indicate one-way- or two-way-flow of information. For example, in one-way-flow, data will be received from or processed on various time share systems but time share systems will not be able to initiate information inquiries into Engineering and Services computer files. On the other hand, two-

way initiation of inquiries between MAJCOMs and their bases will be allowed. Initially data flow will be over commercial lines using WATS or 800 numbers. When the Defense Digital Network (DDN) is completed, information flow could be routed through it. Budget initiatives are underway now to provide standard computer systems in FY 84-87 in all areas except commercial time sharing, Energy Management and Control System (EMCS), and Computer Aided Design/Drafting (CADD) are potential uses. Before some of these systems can be phased in, the base level and MAJCOM/DE systems must be identified.

Automation Philosophy

A total appreciation of how such a network will help resource management is difficult without an understanding of the philosophy behind the use and design of the system. In the past our automated systems were designed to report on what happened and insure that data was pure (i.e. a lot of editing). Such systems are viewed as record keepers and operational people updated them after the fact or when it was convienent. Although this type of system was better than no system, management could put little faith in the data for making the "big decisions." The new philosophy attempts to give management a true tool by building into the total system accessibility, flexibility, responsiveness, and simplicity.

Accessibility integrates automation into the job. By using minicomputers, the tool is placed in the work environment. High terminal densities insure that personnel can use the data when it is needed and also maintain that data as it changes. The tool becomes indispensable to the user and becomes a normal way to do business. For instance, a carpenter can use a stone or a section of a 2 x 4 to drive a nail but a hammer is much better and is considered as the normal tool for doing the job. With accessibility managers will find that they can rely less on stubby pencils and written reports and rely more on electronic data manipulation and displays.

Flexibility allows change. In a fast-changing environment, systems that stay static become obsolete quickly. Users will have the capability to develop their own unique applications and reports using software development tools that generate the program code. With a couple of days training anyone can develop files, reports and displays to satisfy their unique situation. However, there will be a core of files, displays and processes that will be standard and used by all. This is to insure management system integration, to interface requirements, and standardize vertical reporting. Going back to the carpenter analogy, if the only hammer given to the carpenter was a sledge hammer he would be restricted and slowed down in his job. Having many types of hammers available, gives the carpenter a choice of tools to do the job in the best possible manner. Ever tried to drive a tack with a sledge hammer?

Responsiveness allows the system to be used for real time decision making. In most situations managers in service organizations must make on-the-spot decisions. Quick terminal response allows use of the system while on the phone or in a meeting. On the prototype systems entire new reports can be structured and run in less than five minutes. Simple inquires which do not require multiple file seraches can be done in seconds. Responsiveness is like the metal wedge that keeps the head of the hammer on the handle, the hammer can be used quickly and repetitively to get the job done.

Simplicity gives substance to the above. Reading a 1,000-page instruction book to get an understanding of a system does not speak of simplicity, but reading two pages does. The new systems are menu driven, that is, you choose from a list of options what is to be done and with one key stroke the computer knows your choice. These prompt and lead you through the program until it produces the desired results. If you can read the menu and have one finger you can use these new systems. The program and report generation software operates in a similar way. I don't think the hammer would have caught on so quickly if it required two hands and a foot to operate.

These systems have the potential to open new vistas for the decision maker. Relevant information at the right time increases the quality of decisions. However, as with any tool, skill must be developed until the full potential can be exercised. Just like the hammer, until skill is developed there will be some sore fingers once-in-a-while.

All this information at the fingertips of the manager has to come from somewhere, right? So there is a big work load on the already overworked staff, right? Wrong! The information has always been there, but was not in the right form to be used or required too much manual energy to gather. The new systems capture all the required operational data off current forms without requiring new data. In fact, because of the sharing of information within the system much of the required routine data on current forms are provided by the computer so the data input is reduced even over the manual methods. One basic philosophy which is used in the design of the system is that the system support the function of the technician. If we do that and the technician is supporting the objectives of the organization, then the manager will have all that is needed to determine if objectives are being achieved.

System Overview

The Work Information Management System (WIMS) is the cornerstone of resource management for the Base Civil

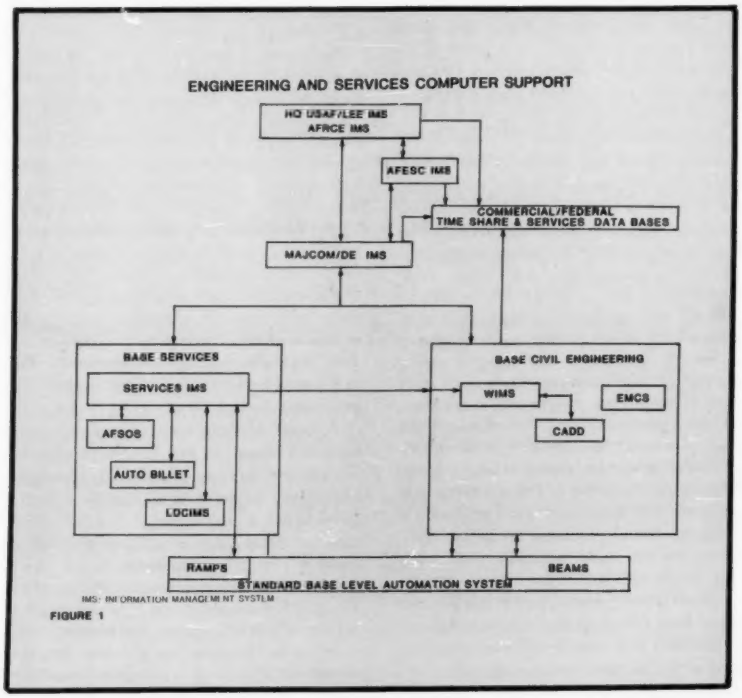


FIGURE 1

Engineer. It provides automation support for each branch, section and function within the organization. There are several tiers of information in the system. Some information is grouped to provide a common data base for all individuals so decisions are based on common factors. Some information is available only within a branch or section because it is not needed elsewhere (for example pre-fire plans). Even though information is available for other people to use, the updating addition and deletion of data is limited to designated personnel. WIMS will provide a series of management indications which will help management gain an overview of squadron operations. The commanders update can be totally automated. WIMS will interface with the Base Engineer Automated Management System (BEAMS). Initially this interface will be accomplished by a daily tape transfer. Once the Phase IV computer system is implemented, this interface can be changed into an electronic one and the user will be unaware that data transfer is taking place between the two computers.

WIMS will be implemented over a four year period starting in FY84. The lead bases are Tinker AFB, Chanute AFB, Misawa AB, and Davis-Monthan AFB. The hardware will consist of a CPU with one million characters of storage capability, a tape drive, one or more disk drives (125 to 300 million characters of storage), 30-45 terminals and 5-8 printers.

Computer Aided Design and Drafting (CADD) will open up new ways to accomplish base comprehensive planning and facility design. The ability to digitize base maps and as-builts and to tie them into the management data in WIMS will provide a powerful planning tool. Not only will the design engineer be able to accomplish his functions more efficiently, but also the community planner will have a tool to display the vast amount of data required for his function. Typically customers are not too familiar with reading blue prints or visualizing relationships from floor plans. With CADD the design engineer will be able to "walk" the customer through a three-dimensional representation of the facility on the computer. Likewise the community planner, though multiple overlays of data from the computer, can rapidly make facility siting determinations. The manager will also have new capabilities of displaying information against a base map background. Because of the speed of the machines, the generation of many alternative solutions is possible. Better resource allocation decisions can be made because more alternatives are available to the decision maker.

CADD is being prototyped at the San Antonio Real Property Maintenance Agency (SARPMA) this year. From this prototype cost effective hardware configurations will

be developed and cost/benefit data generated. Implementation is targeted for FY 87-FY 90.

Commercial/ Federal Time Share Data Bases and Services. It was recognized through the Information Requirements Study that technical support of Civil Engineering could not be combined into one computer system. A computer that is configured to do business processing has a tough time "number crunching" and vice versa. Also there are many technical data bases that need to be accessed to run various environmental models. Two long range initiatives are under way that will bring technical computer capabilities to every level of Engineering and Services. They are the Air Force Environmental Model and Data Exchange (AFEMDEX) and Computational Services.

Through AFEMDEX environmental planners will have access to environmental models and data bases that exist on various computers within federal agencies. Software is being prototyped at HQ ATC/DEV that will make communications with these various systems transparent to the user. That is, an environmental planner can be at his WIMS terminal, using a model located on the AFESC computer, and feeding it atmospheric data from the Weather Service data base, and it would appear to him as if it was all happening on the WIMS computer. Likewise, the design engineer could be running large number crunching problems on powerful Control Data on IBM computers located at MAC AUTO, Boeing or Control Data computer centers. Through these services the base will be charged for only the computer time used.

Other programs that will be available through time share are Paver, the Forest Management Information System, and the Environmental Technical Information System (ETIS). Paver will assist the pavements engineer in determining the most cost effective maintenance strategy for base pavements. The Forest MIS will develop the annual forest management plan for the base forester. ETIS will help the environmental planner keep current on Federal and state environmental laws, and provide aids in developing various environmental impact studies.

Energy Monitoring and Control Systems (EMCS) will continue to be acquired through the Military Construction Program (MCP). Once the WIMS computer is identified, the feasibility on interfacing EMCS data with WIMS will be investigated.

Automated Food Service Operations Systems (AFSOS) will provide the food service manager a tool to reduce the potential for waste and fraud in his operations. It will provide head count and access control, menu planning, forecasting tools and an inventory control system. This will be achieved by tying magnetic stripe readers and point of sale cash registers into a minicomputer. Eliminated are meal cards, many manual forms and the requirement for customer signatures. By collecting data automatically through the cash register and stripe reader, a lot of the current clerical tasks are reduced and managers can devote more attention to supervising operations and insuring better customer service.

This system is being prototyped at Seymour Johnson AFB and will be implemented in FY84-FY86 worldwide. All required terminals, cash registers, and card readers will be provided under this contract. Feasibility studies are being made to size the CPU to provide the Chief of Services with access to this and other services automated systems for inquiry and report generation.

Automated Billeting and Reservation System (ABARS) uses a commercial hotel automated system to provide support for reservations, front desk and housing functions. It is currently operational at Eglin AFB. The software used at Eglin AFB can only go to 600 rooms so another vendor's software is being evaluated at Sheppard AFB to handle the larger billeting functions. Hard dollar savings have resulted from the Eglin test by better utilization of on-base assets and the reduction in the use of con-

tract quarters and certificates of non-availability. With these savings the system pays for itself in two and one half years. This system has been targeted for implementation for FY 85-87.

Laundry and Dry Cleaning Information Management Systems (LDCIMS) will provide automated support for recording sales, labor and inventory control for industrial funded laundry and dry cleaning plants. Expansion to cover all accounting functions is being planned. Off-the-shelf commercial hardware and software is being centrally acquired this year. The NCR 2160 microcomputer-based system was selected. Maxwell AFB will receive the first of the nine systems.

At the MAJCOM level the Engineering and Services staff will have an information management system that will communicate with the base level systems. This will allow the electronic transmission of data to the MAJCOM rather than typed reports. Bases will be able to control what data the MAJCOM can access by proper coding of their data base security system. This system will provide the MAJCOM/DE staff with access to more information without creating additional workloads for base level personnel. One item that must be carefully watched at the MAJCOM is the creation of new data requirements that in fact does create a new workload for base-level personnel. The MAJCOM/DE software was developed by HQ TAC/DE and this sytem will be implemented in FY84 on hardware which will match base level WIMS hardware.

Comparable systems will be operative at Engineering and Services at the Air Staff (HQ USAF/LEE), the Engineering and Services Center (AFESC) and the Air Force Regional Civil Engineers (AFRCE). These systems will be implemented in FY84.

If we conclude that a manager is a person who gets results through people, then an effective manager is one who also satisfies organizational objectives. For the first time these systems will provide managers with a measure of their effectiveness and an ability to document that they are in fact doing better with less.

Sperry-UNIVAC Picked To Replace Base-level Computers

The U.S. Air Force announced a decision to select Sperry-UNIVAC to replace the base-level computers at 118 major bases and 276 other units worldwide. Assistant Secretary of the Air Force for Financial Management, Russell D. Hale, said the eight-year contract is valued at $476,227,023 and is a savings of $335 million from the original contract estimate with projected 12-year life cycle cost savings of more than $600 million.

In making the announcement, Secretary Hale noted the savings will result from our having used head-to-head competition between computer manufacturers. The savings are a significant example of the Secretary of Defense's continuing drive at economies and efficiencies.

The acquisition, known as Phase IV Program, was developed with the full oversight and cooperation of the House Government Operations Committee and other concerned congressional committees. The strategy, similar to that used for major weapon systems, had the manufacturers take the Air Force's most complex user applications, integrate them into their computer equipment, and demonstrate — through a series of nearly 20,000 test steps — a complete computer system capable of handling information needs into the 1990's. This method was adopted by the Air Force to reduce the risk associated with high technology and to obtain the cost and schedule benefits of private sector competition.

A total of 153 computers and nearly 7,000 remote terminals will be installed by mid-1985. They will replace the 277 older computers.

Phase IV computers are integral to the Air Force fighting capability, said officials. Management of virtually every base activity is dependent on these systems both in peacetime and in war. The computers will be used at each base to schedule and monitor everything from flying to laying cement.

Computers to be replaced are the Burroughs 3500 and the UNIVAC 1050-II. The latter was acquired in the early to mid-1960s. Acquisition of the 3500 was initiated in the late 1960s, with most of them acquired in the early 1970s. Both systems have been through a series of software and equipment changes and modifications.

Maj Theodore M. Golondzinier is special assistant for data automation to the commander and is assigned to the Information Systems Management Office, Air Force Engineering and Services Center. He is a professional engineer in the State of Ohio and has a master of science in Operations Research from Texas A&M University and a bachelor of sciences in Engineering from UCLA. He is a member of the NSPE, SAME, Phi Kappa Phi and a senior member of AIIE.

Information . . . the key to resource management . . .

When you need it! The way you want it!

**by Maj. Bill Hamill,
Capts. Barry R. Wentland and
Tom Risher, and
TSgt. James F. Ruth**

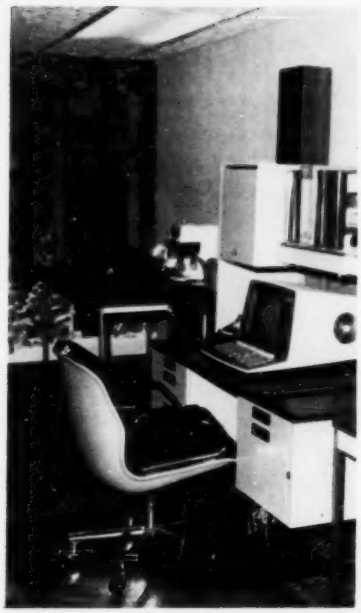
A new approach to information processing is helping the folks at HQ Tactical Air Command Engineering and Services manage everything better, from readiness to construction projects to energy conservation. An information tool has been developed that's useful at headquarters level and can be effective at base level too.

The information needs of Engineering and Services at all levels are more varies and complex than most of us realize (Figure 1). These needs include all aspects of engineering design and construction, programming, operations, budgeting, fire protection, energy consumption, housing, feeding, and billeting. With few exceptions, the employees in all of these areas must meet nearly impossible record keeping and reporting requirements. Along with this fact is an ever increasing awareness that we must make and keep commitments to our customers and to our own associates. The best alternative to both commitment needs is a menu-driven, "user-friendly" computer

The information processing industry is currently a hot bed of activity. Hardware was first considered the most important; then software became the pacing element; now the emphasis is shifting to the use and their ability to obtain usable information in the appropriate format when needed. We can now do this without relying on a programmer. Computers are "friendlier"—an industry term that describes to how easy it is to use the machine. This "user friendliness" made it possible and easy for TAC Engineering and Services personnel to create and use 600 reports and 150 viewgraphs on a Wang VS-100 computer without in-house or contract programmers, without any change in manpower, and without complex "how to" operations manuals.

Too good to be true? This system has been in use for nearly a year at TAC. Permit us to answer the most commonly asked questions concerning our new computer supported management information system. We have made presentations before varied levels of potential Air Force users. Rarely have we been able to anticipate every question. However, we have been able to anticipate most customer concerns. The questions and answers which follow are compiled from meetings with E&S people, interested people outside our mission area, and from written questions.

QUESTION: ***What kind of system does HQ TAC have?***
ANSWER: A user-oriented system that is easy to oprate. It requires a minimum of technical expertise. Reports/programs are available on demand. The information is drawn from common data files that are shared by the entire organization.



QUESTION: ***What hardware is your system comprised of?***
ANSWER: Our particular system consists of a two megabyte (Mb) central processing unit, 19 multi-purpose work stations (with data processing and word processing capability), 21 data processing terminals, three 75 Mb disk drives, and dual-density tape drive, a 600-line-per-minute printer, and six letter-quality printers. But more important than the hardware is the software—the system must be "user-friendly" for people to embrace it.

QUESTION: ***What is Automated Management Information System (MIS)?***
ANSWER: We at TAC would define an MIS as each of us using our computer to select, store, process, and retrieve data required to reduce uncertainty in decision making by yielding current information for workers and managers at the time they can most efficiently and effectively use it.

QUESTION: ***What are the characteristics of the TAC computer that make it "user-friendly?"***
ANSWER: Terminals are available in every division. The average response time is two seconds or less. Information is "on-line" and accessible from a menu (listing of options) by pressing a single key (associated with the chosen option). When changes are needed, the system is flexible enough to allow quick change. All users are able to work alone, concurrently, and transparently to each other. For example, a secretary can input TDY information; an engineer can run an electrical distribution analysis program, the DCS can obtain the status of construction projects; and an industrial engineer can write an analysis program in a computer language such as FORTRAN, all seemingly at the same time.

QUESTION: ***Who uses the "user-friendly" MIS at HQ TAC?***
ANSWER: Virtually everyone in our organization uses the MIS for a variety of reasons, in a variety of ways. Similar to the way the airlines use their reservation systems, we have a system which puts a computer terminal in almost every office. Data is entered at its source by the person having primary responsibility for it—the person most likely to catch an error. Summary reports of commander's update-type information is at the fingertips of top management automatically. And most importantly, 90 percent of these reports are developed at the users' level to meet their needs, not a reflection of someone else's view of their needs. Standardization of information formatting becomes necessary only when required for interfacing with other organizations, usually for upward reporting.

QUESTION: ***What else, besides "user friendliness," has contributed to the success of the system?***
ANSWER: The key here is an integrated approach. Everything fits together. People work together as a team in a way that has been talked about for years. While focus is put on the users and their personal benefits, must of our information is really a composite of data created by several people. Consider an MCP project for instance. Program development, design engineering, construction engineering and requirements are all needed to work a portion of the program. Top management needs to know the overall status. In a manual system, someone has to search for and coordinate this status; in an automated system, the status is automatically the result of the people in each division doing their job. The system allows each person to enter their own pertinent data resulting in the current status being available to all.

QUESTION: ***What does a user have to do to obtain information?***
ANSWER: Each person has direct and easy access to a terminal. The terminals have a keyboard similar to the one found on a typewriter plus a row of numbered special function keys. After typing in a three-letter ID code and a password, a personalized "menu" is displayed on the terminal CRT. This menu is a numbered listing of user choices. These choices include items such as reports or data entry screens, word processing, or electronic mail. By selecting a number and pressing the associated special function key, the choice is presented in a matter of seconds. There is no user manual or specialized technical training required. The user can view the displayed report or obtain a full or partial printed copy of the report by pushing the appropriate keys.

QUESTION: ***What does a user have to do to input data?***
ANSWER: Users put data into the system by selecting the appropriate choice from their menu. The computer then gives then

a screen with blanks to fill in for each data field. Data is entered only once at its source and integrated throughout the system. Everyone working with this particular data element has consistent information.

QUESTION: ***Why is this new approach better than the standard approach?***
ANSWER: It provides a decentralized, user-oriented, flexible system. This replaces the standardized, rigid system controlled by someone who is not as familiar with, or is unable to respond quickly to, the user needs.

QUESTION: ***What do you consider most important in user acceptance of the system?***
ANSWER: Our most important key to acceptance is allowing users to create management information that meets their specific needs and modify the information format themselves as their needs change. That people are selecting their own management information and are convinced that their own function is enhanced by using the system account for its success.

QUESTION: ***How much training was required to get this system operational?***
ANSWER: Two officers received one-and-one-half weeks of system training. They, in turn, trained the rest of the people in HQ TAC/DE. Each person received one-and-one-half hours of familiarization training; one person in each division received a two-day user's course; and each secretary received a three-day word processing course. People learned they couldn't hurt the machine and that it really was easy to use.

QUESTION: ***If you don't have programmers and large manuals, how does the use create a program?***
ANSWER: New applications are created as the computer presents choices in English. The user answers by inserting the information necessary for the computer to write a program that will do what the user wants. The entire process happens in a matter of minutes. Once completed, the report can be repeatedly reviewed or printed in seconds by selecting it from the user's menu. This is accomplished by pushing the menu key associated with a report. The computer is directed to run the report using the current data and display it for review on the terminal. Pressing another key allows you to obtain a hard copy printout on the systems printer.

QUESTION: ***What happens when the computer "goes down?"***
ANSWER: First, our experience at TAC indicates that new computers don't "go down" like they used to. In the first year, we had two hours of unplanned down time and about 10 hours of scheduled maintenance. The computer has several features that protect data should there be hardware failure. Also, each evening, we copy the entire system to tape for backup. A total failure, which by the way, is less likely than a fire, would result only in a few hours loss of data depending on when it occurred during the day.

QUESTION: ***Are there other benefits besides quick access to reports and "electronic viewgraphs?"***
ANSWER: Yes. Among our added benefits are word processing for all secretaries and the ability to take reports from data processing and produce them in letter quality. Also, electronic "buckslips" are made possible by using a message sending program. Any user can send a message to another co-worker or a broadcast to everyone in the organization.

QUESTION: ***Can you share information with other computers?***
ANSWER: Yes, we share in two ways. We currently receive some data files on tape: Civil Engineering Contract Report System (CECORS), Real Property Inventory, Energy Conservation History, Personnel records, and some technical programs from AFIT. We can also "call up" other computers an use programs or data that are resident on them. Our success in this area has been quire good, especially in the transfer of data files.

QUESTION: ***Can this system be interfaced with base systems in Civil Engineering and Services?***
ANSWER: We believe that by the end of this decade, each squadron, site, all associated headquarters, Air Force Regional Civil Engineer, AFESC, and other base organizations will be linked together sharing appropriate information so that data can be input only once at its source.

QUESTION: ***What types of reports would a base have?***
ANSWER: This is being developed now. HQ AFESC designated a Tiger Team of 16 select people, chosen from all major commands to use our "user-friendly" system to give a detailed answer. This occurred from October to December 1982, and applied the results of the Information Requirements Study, completed September 82. As a minimum, however, Commander's Update information, Job Order Reports, Work Order Reports, Material Control, Engineering Design, Fire Department, Housing and Services will all be included. The team will also produce the software. This will allow generation of these reports.

QUESTION: ***Does your system have graphics or computer-aided design and drafting (CADD)?***
ANSWER: Graphics capability has been approved and is being acquired for use by HQ TAC. The wait was because the graphics had to have certain technical capabilities only recently available, the main two capabilities being: 1) A non-programmer-oriented menu driven approach, and 2) Dynamic access to existing data files. Now that this is possible, we can continue with the user-friendly, menu-driven approach contained in the rest of the system. The graphics output will automatically change as the data file is changed.

Headquarters TAC is looking hard at CADD, but is holding off for the same reasons it held off on graphics. Also, at headquarters, it is found that "engineers" must do a lot of writing and require support for decisions, not design generation.

QUESTION: ***Will these systems save money or manpower?***
ANSWER: Probably not. Computers are an investment—providing new, better ways of doing things, expanding capabilities. They are becoming like the telephone or the automobile. If you try to determine how much money they save, it is very difficult. They are not inexpensive and yet there are few people who can live without them in today's world. Also, the price of this new technology gets lower as advances are made. For example, 25 years ago, it cost $1.26 to complete 100,000 multiplications on a computer (***Computer Decision Magazine,*** June 82). Today the cost is less than one cent. When compared to labor cost or labor availability, the price of this type of automated MIS is reasonable today and likely to be more reasonable tomorrow.

QUESTION: ***Do we really need this kind of system to get our job done?***
ANSWER: The answer is rapidly becoming clear. We have more work and fewer people to get the job done, while people in turn expect more from service-oriented organizations. Each of us expects fast, efficient service when we get a hamburger or go to have the car fixed. Engineering and Services customers are no different. Our managers must manage this environment where new requirements and changes to old requirements are always ocurring, possibly at an increasing rate. Unlike a football game, we don't have time outs. Controlling something like projects at a major command or job orders at a base can be a nightmare when we get behind. Management underrates its own role in productivity, failing to demand the same degree of efficiency in the office as in a shop. In short, managers must adjust to the new communicaton and information demands of a service-oriented society.

QUESTION: ***You have combined data processing with work processing and are implementing graphical information display. What do you see as future technology which will enhance communication even more?***
ANSWER: We can forsee a potential for image processing, audio processing and the tying together of the various technologies into networks which span the world. Combined with human engineering, these will be available and easy to use. The technical aspects will arrive as the end user and the performance of the organization demands them.

QUESTION: ***What kind of security does the system have?***
ANSWER: People have their own menus allowing them to access information associated with their job. Their ID and password enable them to get this menu. We haven't had many problems with passwords being given away for two reasons: (1) Anyone who needs to retrieve information can request their own access, and (2) Users don't like to give others the ability to change their reports which are used by the boss and others in the organization. Also, reports have a system security which allows only the creator to make changes while still allowing others to read them.

QUESTION: ***What is the most important potential gain that a computer will help us realize?***

ANSWER: We can improve our credibility by consistently making and keeping commitments. We now have the opportunity to create a management system that will give us a forward look at our commitments—those we make to our customers (external) and those we make to ourselves (internal). Our problem has never been accomplishing large quantities of work. Instead, being able to quickly communicate with our bases and our fellow workers about the status of a requirement is our most difficult challenge. Solving this problem will, as a minimum, improve perceptions of our productivity. To quote General Ellis, "We are often forgetting that our real imperative has a lot to do with people. How our customers perceive or believe that their needs are being satisfied—or alternatively not being satisfied—is the ultimate measure of our management effectiveness."

Maj. Bill Hamill *is system manager for the Management Information System (MIS), HQ TAC/DE. He earned his bachelor of sciences degree in General Engineering at the USAF Academy, and his master of sciences degree in Systems Management from the Florida Institute of Technology. He is a member of the Society of American Military Engineers.*

Capt. Tom Risher *is the program manager for the Management Information System at HQ TAC/DE. He earned his bachelor and masters degrees in Industrial Engineering from the University of Central Florida. He is an engineer in training in Florida.*

Capt. Barry R. Wentland *is the management information system data base administrator for the deputy chief of staff, Engineering and Services, Headquarters Tactical Air Command, Langley AFB, Va. He earned his bachelor of sciences degree in Civil Engineering and master's degree in Civil Engineering from Rensselaer Polytechnic Institute. He holds a master of sciences degree in Management from the University of Northern Colorado. He is a Registered Professional Engineer and a member of the Society of American Military Engineers.*

TSgt. James F. Ruth *is a command systems management technician. He previously served as a contingency plans technician in TAC Force Development. He earned his bachelor of arts degree in Sociology from Northwestern State University. He has also applied for associate degrees in Civil and Structural Engineering from the Community College of the Air Force.*

People, Places & Events of Interest

AIA PICKS GEN. WRIGHT FOR HONORARY MEMBERSHIP

Maj. Gen. Clifton D. Wright Jr., director of Engineering and Services for the United States Air Force, has been elected an honorary member of the American Institute of Architects. He will be installed by the AIA at New Orleans, La., May 22-25.

He is a graduate of Clemson University with a degree in Architectural Engineering and George Washington University with a master's degree in Management. He is a registered Professional Engineer.

Of the 13 selected for honorary membership nationwide, General Wright is the only military officer. "General Wright's advocacy of design, his institutionalization of programs which improve the quality of design, as well as his persistent and consistent efforts within the Air Force provide a legacy for the entire design profession," said his nomination.

An advocate of excellence in design, General Wright was the driving force behind the first Air Force worldwide conference on design held in June of 1982 at the Air Force Academy, Colo. Main thrust of the conference was an insistence that excellence in design means utility, lowest cost of ownership, and motivating the users and occupants to exercise care and pride in a facility.

Among other highlights of General Wright's career, the AIA also cited:

- Establishing a senior-level design consultant at Air Force headquarters to coordinate interior design
- Setting up an Air Force design advisory committee to provide expert advice on state-of-the-art advances in design, and to facilitate the Air Force goal of seeking excellence and innovation in design.
- Starting a special two-week course at the Air Force Institute of Technology, Wright-Patterson AFB, Ohio, to familiarize key people with methods of programming and creating the best architectural, landscape and interior designs possible for all base facilities.
- Revamping and revitalizing the Air Force program to recognize the best in design through national-level awards determined by a jury of recognized professional architects.
- Significantly benefitting the quality of life for Air Force people and their families.

General Wright has exercised an influence toward design excellence in the Air Force for many years. Among his ideas was establishing studio projects to involve architectural students in actual Air Force projects, beginning with Clemson University. The concept is now worldwide in scope.

CONSTRUCTION, ENVIRONMENT CROSS POTOMAC

The Air Force's environmentalists have moved to Bolling AFB, D.C., while the construction team has moved to the Pentagon.

Col. Robert L. Klingensmith and the AF/LEEV division are now in Bldg. 510, Bolling AFB. The Airfield Facilities Branch remained in the Pentagon under the Programs Division, and is now AF/LEEPF.

Col. James M. (Mike) Conry and the Engineering and Construction Division office (AF/LEEE) moved to the Pentagon with the Construction Branch.

ENVIRONMENTAL NAMES MAJ. TERMAATH

Maj. Stephen TerMaath, who specialized in hazardous waste recovery while with the HQ AFESC Engineering and Services Laboratory at Tyndall AFB, Fla., moves to the office of the Deputy Assistant Secretary of the Air Force for Installations, Environment and Safety.

He will succeed Lt. Col. Peter S. Daley as the assistant for Environmental Quality. Colonel Daley has moved to the Department of Defense Secretariat working in the office of the Director for Environmental Quality under the Assistant Secretary of Defense for Manpower, Reserve Affairs and Logistics.

CAPT. MOGGE GETS CROCKER AWARD

Capt. John W. Mogge Jr., an assistant professor with the Air Force Institute of Technology School of Civil Engineering, was recently selected winner of the Gage H. Crocker Outstanding Professor Award.

The award recognizes the AFIT faculty member who makes the most significant contribution to the AFIT education process during an academic year.

Captain Mogge, an eight-year Air Force veteran, was selected based upon his excellence in teaching, curriculum development, and educational innovations.

"Teaching 13 AFIT resident programs and four on-site courses, he carried one of the heaviest teaching loads with more than 500 hours," said Col. Phil V. Compton, Dean of the School of Civil Engineering.

In addition, he taught various CE courses by means of the Teleteach Expanded Delivery System. He also taught several courses at the AFIT School of Engineering and at the Leadership and Management Development Center, Maxwell AFB, Ala.

"I'm really happy and honored to have been selected for this award. This is the first time a faculty member from the School of Civil Engineering has received the Crocker award. That makes me feel extra proud" commented Captain Mogge.

A registered professional architect in Florida and Ohio, he earned both his bachelor's and master's degrees in Architecture from the University of Florida.

MX ENGINEER

The Air Force Regional Civil Engineer M-X (AFRCE-MX) is redesignated the Air Force Regional Civil Engineer-Ballistic Missile Support (AFRCE-BMS). The change went into effect on Jan. 20.

Old engines never say die, they wait.

by Sgt. Lea Blake
Associate Editor

In an old field in the barren beauty and wonder of Alaska sat an old fire engine. Its days had long since passed into the void of age. Birds had built nests in its pump cavity. Bullet holes had pierced its engine hood and lights. Someone had once tried to tow it into motion, flattening the dual Firestone hard rubber tires. it sat there for years. Progress drove on but the engine's headlights were no longer working, the discarded wonder of an era long gone. But there was something about the little fire engine — something that wouldn't and couldn't die. And it waited for that something — or someone.

Then one day the fire chief at Elmendorf AFB, Alaska, Douglas Courchene and his deputy drove by.

"I first discovered the old fire truck in an open field near Wasilla Lake in 1969. The deputy fire chief and I asked around to find out who owned it," said the chief. So, he and his deputy began an intensive investigation to find the owner of the little truck. They finally found the owner in Palmer, Alaska. From her they learned that the little engine had been delivered spanking new to the Alaskan Railroad in Anchorage. Although its exact arrival date in Alaska was unknown, it was determined that the old-timer was an abandoned 1922 American LaFrance pumper. It had been a possession of her late husband.

Chief Courchene asked if they could use the old truck in Fire Prevention Parades at Elmendorf and Anchorage. He told her that they would fix up the truck and try to make it as good as new. So, with the woman's permission, the members of the 21st Civil Engineering Squadron at Elmendorf AFB transported the truck to the base where it was transformed into the beloved vintage classic it is today.

In remembering the project, Chief Courchene said, "This generous lady let us have the truck and we agreed to restore it at Elmendorf. The Base Civil Engineer, Col. A.M. Dougherty and base commander, Col. Al Johnson supported the project and restoration started with earnest. Elmendorf fire fighters fell in love with the old truck from the beginning and interest grew base-wide as more people offered to help make it run. Two of our people were even certified as the engineer (driver) and assistant.

"Fire fighters refinished the wood spoke wheels and hose bed. Colonel Dougherty donated the large brass bell. The 750 gallon-per-minute rotary gear pump was also repaired by fire fighters. A master mechanic out of transportation fabricated miscellaneous parts and repaired equipment and the chemical tank," continued the chief. "The general mechanic shop of the 21st CES has as its motto 'Can Do Will Do'. They machined parts for the engine, transmission and chain-driven rear wheels," he said.

It took about six months to get the engine to run. "But when it cranked," recalled the chief, "it was loud and healthy!"

Civil engineering painters painted the body bright red and their sign painters added decorative gold design. The little fire engine shined bright as new — its days were reborn — death would not take its toll with this little fellow.

Since then the truck has spent seven years in parades, Fire Prevention Weeks, and community events as a display along with today's modern fire fighting vehicles, and in the base open house celebration. Its passengers have included many distinguished military figures and the character team of Smokey the Bear and Sparky the Fire Dog. Future commitments, according to Elmendorf officials, are not firm. The engine is presently housed at Elmendorf's Fire Station One. "But," added officials, "it is always ready to serve as an example for the hundreds of man-hours put into it to show the pride of workers from the 21st CES."

"There's always tradition associated with fire departments everywhere," said the chief, "I'm proud to share a part of it."

When a person becomes so involved with a project, and especially one of this nature, we tend to wonder if a sort of "love" is attached to it. When asked what it was like to leave the little truck next to its grandchildren like the gigantic Crash Fire Fighting and Rescue (CFR) Vehicle used on most Air Force flightlines today, Chief Courchene said, "No question about it, I grew attached to the truck. All the hard work was worthwhile and very rewarding as far as I'm concerned. You know, I tried to buy the truck once (pause) but it wasn't for sale."

Engineered Performance Standards:

A Management Tool

by Miles Gray

Engineered Performance Standards (EPS) offer managers of the civil engineering squadron a unique tool to optimize their important resources used in maintenance and repair work. EPS's are developed by engineers and are based on proven Industrial Engineering techniques.

Primarily, EPS's are applied by operations personnel in estimating work orders and job orders. This includes the Work Maintenance Program (RWP) but not utility operations. The managers of our workers (superintendents and shop supervisors) should consider any EPS given as a benchmark for an average worker to meet and openly give them recognition whenever they better the EPS estimate. EPS lets the workers know what is expected of them and if they have performed up to those expectations. It also provides a performance incentive to "beat" the EPS estimates on all work assignments which can result in increased efficiency and ultimately help improve productivity.

Second-level managers should take direct interest in the EPS program and evaluate each cost center by comparing the EPS estimates versus the actual labor hours reported. Variances should be noted, the cause should be investigated, and positive steps taken to minimize the variances. Also, EPS can be used as a reasonable starting point to budget cost, identify backlog, establish training requirements and establish incentive plans which could lead to rewarding the cost center supervisor for a measured increase in productivity.

The higher echelon managers should not only encourage the use of EPS but give tangible recognition for increased efficiency from the proper application of EPS. The base civil engineer (BCE) should elevate the use of EPS to a special interest item in the BCE weekly update and renew emphasis on enhancing the efficiency of in-service work.

Myth

Some people believe that EPS times are based on "supermen" using sophisticated tools and equipment, working with record-breaking speed under ideal conditions. This is a prevailing myth and is simply not true.

Definition

"Engineered Performance Standards represent the average time necessary for a worker possessing average skills and qualifications, working at a 'normal' pace ('normal' is a working rate easily attained by the average craftsman), expending normal efforts under average working conditions, to perform a defined amount of work, of a specified quality, following acceptable trade methods." (Reference AFM 85-58, Planner and Estimators Workbook.)

EPS Development

EPS's are designed to provide consistency and sufficiently accurate estimates for maintenance type work, with minimal planning effort. The EPS system is developed using a "range of time" concept. It is recognized that, unlike production work, maintenance jobs vary in scope and it is uneconomical to expect detailed standard development. Accordingly, EPS tasks are grouped or slotted so that the "slot" time is approximately the median of the range. For example, a task that is assigned to a group may have an estimated time of eight hours while it is expected to take between seven and nine hours depending on work site conditions.

EPS average times, for most of the craft data, are developed by methods time measurement (MTM). MTM is a predetermined time system where work content of a task is subdivided into operations; these are basic fundamental motions of work and are called elements. A smaller predetermined time value, called a TMU (time measurement unit), is assigned to each basic motion of the element. These are ag-

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gregated together to form the core craft time and recorded in the EPS handbooks. Some craft times are verified by on-site time studies by a qualified industrial engineer or technician. These studies are made at Wright-Patterson, Fairchild, Eglin, Edwards and Pease AFBs. The time standards are established using the "skill-mix" assigned by bases for work accomplishment. This includes the assignment of 3 and 5 skill levels where applicable.

Allowances

In EPS procedures, the craft time is ***increased*** by the "general data" such as job preparation, craft delay allowance, travel time and the addition for partial day influence. These additional allowances range from 20 to 40 percent of the craft time depending on the travel zone, number of workers and the type of trade. All these allowances are developed through work sampling and time study. In order to expedite and simplify the allowance calculations a device called a nomograph was developed. A nomograph eliminates time consuming mathematical calculations. It enables the planners to compute all these allowances by drawing three straight lines.

EPS Utilization

EPS utilization simply means to what extent EPS is being utilized to estimate real property maintenance work. It is measured as a percentage of the total direct actual hours that were estimated using engineered performance standards. However, direct work hours expended in plant operations, and emergency work is presently exempt from the application of EPS.

CONUS Base Visits

Established policy is that DoD Real Property Maintenance Activities in the CONUS (includes Alaska and Hawaii) will be visited a minimum of once every three years to determine the EPS Utilization. Our goal is to visit each base once every two years. Based on these visits, the EPS utilization teams, from the management division of the Air Force Engineering and Services Center, determine the Air Force EPS utilization and sends a formal report to the NAVFAC Industrial Engineering Center, Norfolk, Va., and the appropriate Air Force MAJCOM. The NAVFAC center consolidates similar EPS utilization data from other DoD activities and annually reports to DoD (MRAL) and Congress.

The objectives of the Air Force EPS utilization visit teams are not only to determine the utilization rate but also to assist planners in the proper application of EPS and to emphasize the use of EPS as a management tool for evaluation and improving productivity. The EPS team members conduct several group and one-on-one EPS appreciation sessions with staff members of the base civil engineer throughout their visits. Informal and practical assistance is rendered to the planners and production control personnel in the proper application of EPS. Workshops, specially tailored for the benefits of the first-line supervisors, are conducted in an informal manner encouraging individual participation in the discussions.

Overseas Bases

DoD does not require that overseas bases be included when determining EPS utilization. The Air Force advocates, but does not require, the use of EPS at overseas bases. Policy of the other services varies concerning visits to overseas bases.

Benefits of EPS

1. ***Improved Productivity:*** EPS properly applied by planners and followed by shop personnel can reduce the variance between the estimated and actual work hours. EPS estimates are reliable and consistent, allowing management to take corrective steps to minimize the variance for more effective work accomplishment. Additionally, workers will try to obtain a standard which they feel is justified and fair for more efficient work accomplishment. Being more effective and efficient will lead to better productivity.

2. ***Improved Work Descriptions:*** When properly applying EPS the job must broken down into component parts of work or tasks. A complete description of these tasks enables the planner to properly assess craft times and provides detailed guidance to the shop on the work to be accomplished.

3. ***Improved Work Planning:*** EPS requires breaking a job down into sections or phases. Phasing of the crafts in a logical work sequence is required for a smooth and orderly EPS estimate from the handbooks. Therefore, good job planning is essential to coordinate each of the crafts involved.

4. ***Improved Backlog Management:*** Hours based on EPS have both the consistency and accuracy required to identify a realistic work backlog.

5. ***Uniform Application:*** Since EPSs are based on the work hours required to accomplish a specified amount of work, it can be applied anywhere a similar unit of work exists. Therefore, EPS, when properly applied, can be used at any activity regardless of its geographic location.

Conclusion

Improved efficiency is needed to offset escalating costs which are increasing on a daily basis, while our resources are fixed or declining. Funding problems coupled with our aging facilities are resulting in an increase of our maintenace backlog. The proper application of EPS is a starting point for management to improve efficiency in maintenance work. A high usage of EPS can be a catalyst to motivate workers and supervisors in achieving self-satisfaction by reducing the variance between estimated and actual hours for more effective work accomplishment. Effectiveness plus efficiency result in improved productivity.

Background

Each of the services (Army, Navy and Air Force) began using their version of performance standards for work estimating in the mid 1950's. The Air Force in the early 1960's published the "Chapter 5" standards in AFM 85-1. The Army and Navy also implemented similar, but more elaborate, systems. In the late 1960s the Department of Defense conducted a tri-service test to determine the best real property maintenance performance standards available. Based on the test DoD selected the Navy EPS program and directed its use in DoD real property maintenance activities. Because of budget cuts in the late '60s and early '70s the Navy Facilities Engineering Command was unable to adequately maintain and update their EPS publications. These and other circumstances hampered the full acceptance of EPS within the DoD activities.

In the mid-1970s Congress asked the Government Accounting Officer (GAO) to study the use of performance standards for real property maintenance within the DoD. In 1976, as a result of their study, GAO determined that the proper application of performance standards (in particular the Navy EPS) could significantly increase productivity in real property maintenance and recommended that the Navy EPS program be "revitalized" (Army, Navy, Air Force, Marines and DLA). In 1977 DoD directed that its real property maintenance agencies provide joint funds ($500,000 annually) to establish, update and maintain the EPS program. The Navy was designated the lead service. The Navy Facilities Engineering command established the joint funded NAVFAC Industrial Engineering Center at Norfolk, Va. The Chief of Naval Operations provided 16 ceiling points for manning the NIEC.

In 1978 Congress demonstrated their committment for the utlization of EPS and directly appropriated 16 positions and $500,000 annually to DOD. Each service was given positions and $125,000 annually to perform their own EPS utilization base visits.

The Vehicle Big Picture:

What the civil engineer needs to know about it.

By Capt. Robert J. Marshall

In today's world of productivity consciousness, the base civil engineer needs to be aware of the impact made on his productivity by the vehicles under his control. This article was written for the civil engineer in the field, from a civil engineering standpoint, to help him understand and appreciate what is involved in the Air Force vehicle program. For the sake of explanation (from the CE viewpoint) of this overall process, consider a pie cut into three various sized pieces. These pieces represent the basic steps the civil engineer needs to be familiar with in order to better understand and manage his fleet. These basic and sequential steps involve the BCE at base level, the DE community at the major commands and the Air Force logistics community. These steps are:

- Vehicle Allowance and Authorization
- The Vehicle Priority Buy Process
- Budget Picture

Vehicle Allowances and Authorizations

The first and most important of the three steps is the identification and authorization of requirements. This step begins most often within the base civil engineering organization itself. As end users of equipment, civil engineering personnel are in the best position to determine the effectiveness of what they are utilizing and what would be better for a particular job. But what is the best way to tell someone what you need and who do you talk to about these ideas? There is a way and there are people whose job it is to help — your base and command equipment managers. We can't be privy to all the necessary paperwork, but these individuals can give you some of the answers you'll need and help you with the procedures.

To get started, let's look at some of the tools you have available to you at the base level. First a squadron should have a record of all the equipment items it is actually authorized. This is the Custodian Authorization/Custody Receipt Listing (CA/CRL), and a copy of the vehicle portion should be kept as part of the squadron's vehicle control records by the vehicle control officer or NCO (VCO/VCNCO). With this listing you can determine if a particular item has already been authorized for your squadron.

Be sure that items approved since the last buy submission are included in the current cycle. If the authorization was approved before the last base vehicle buy submission, then it must be ascertained what, if anything, has been done to obtain this item and if it has already been allocated to your base and unit. A quick review by VCO/VCNCO of the base's past submission of the annual vehicle priority buy, AFTO Form 468, will reveal if the item has been submitted to higher headquarters and in what priority. When no submission has been made or if the submission was low, a review of the reasoning behind this action is in order.

Further status on an item submitted to the major command can be checked with the help of the base vehicle operations officer (VOO), through whom you can find out if the item was forwarded in the command consolidated buy submission and whether or not an allocation has been made against this requirement. If an allocation has been made to your particular organization, the hard part is over, now all you have to do is wait and make sure the requirement does not change.

Now what do you do if the item is not already authorized? First of all, it must be determined whether or not the item is presently listed in an applicable table of allowance (TA) with a usable basis of issue (BOI). A TA is an equipment allowance document which prescribes basic allowances of organizational equipment and provides a control to develop and requisition or change the equipment authorization inventory data. For most of the vehicular types of equipment in civil engineering, TA -008 and 010 are the applicable documents in which you can find the allowance quantities for your organization.

The BOI is the quantity of a particular item that may be authorized. Items are listed in a TA by national stock number (NSN) and a short nomenclature. To find an item in the TA you'll need to know its stock number or at least what stock class it is likely to be under. This needn't be confusing as it sounds as similar items are usually grouped in the same stock class. If the asset is used in snow removal, for instance, then it most likely will be listed in the 3825 stock class of vehicle items in TA-010.

After an honest search of the TA, if you still are unable to find your item it is then time to seek the help of the allowance and and authorization (A&A) section of the customer support branch in base supply. These people are better equipped to research an item through various channels and give you a final answer. If the particular item is not already listed in an appropriate TA, then it will be necessary to establish an allowance as well as an authorization. Accomplishment of both of these steps is necessary before a vehicle can be entered into the acquisition program.

Obtaining an allowance and/or authorization requires that the user prepare and submit an AF Form 1374. For organizations developing both a new allowance and an authorization, one set of paperwork will accomplish both functions. Details are important. Development of cost saving analysis, increases in productivity and mission capabilities, etc., will go a long way in proving the need of a particular asset. Doing this work is also a good way to be sure you really need the item before you go asking for help in acquiring it. This is one of the places that the VCO/VCNCO can do a lot to improve the quality of justification sent forward. This individual should have and maintain working copies of all the vehicle assets in the squadron, information on what has been requested, what is in the vehicle priority buy submissions, and what is already in the pipeline heading toward you. All the above mentioned work can be reduced greatly by a well kept VCO/VCNCO data base in the squadron.

Now that you've got all this information gathered, it's time to [illegible] 1374. Air Force Manual 77-31 — Volume 1, Chapter 4, para 4-5, will provide the basic guidance for the information needed on this form. The areas of biggest concern are items 2, 6, and 7, which deal with what the vehicle is to be used for, impact if it is not made available and an explanation of why presently authorized assets cannot do the job. This information is important because it will follow the request throughout the approval process so don't skimp on the justification nor fill it up with junk for volume.

After the 1374 is completed, it must be forwarded to the VOO for review and further action. The VOO will recommend approval or disapproval with his rationale and

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his recommendation for realignment or increase in authorization, in writing on the 1374, to the Vehicle Authorization Utilization Board (VAUB). The VAUB will approve or disapprove by endorsement and decide on the actions required to fulfill the requirement. If establishment or change to an authorization is required, then the VOO will prepare an AF Form 601 and forward it to the command CEMO. It's always a good idea to attach the AF Form 1374 to the AF Form 601 as this saves retyping and the possible exclusion of any important information — check on this with the VOO, it might save both of you time.

Once the AF Form 601 has been forwarded to the CEMO, don't forget it; and, if there is an urgency in this request, you should assure that the command DEM staff is aware of your requirements.

If the AF Form 601 has been in the system for some time, it's a good idea for you to check on its status — things do get lost! A quick call to the A&A section of base supply should get you someone who can find out where this paperwork is. If they can't seem to find out, contact your command DEM staff and ask them for help. The DEM staff at the command level is in a good position to help track and respond to your questions.

The job of the command CEMO is to review your request and determine if some action has already been taken or if some action should be taken. If the approval level is within his area and no other actions are pending, then, based on the accompanying justification, the request will be approved or disapproved and returned to the requestor. If, however, the approval is not within the command CEMO's level, then the entire AF Form 601 and attachments must be forwarded to the TA monitor at Warner Robins Air Logistics Center, Robins AFB, Ga.(WR-ALC/MMMEC). The job of this individual is in part like that of the command CEMO only with a higher approval level except that review at this level will most likely take place in two parts. After initially receiving the AF Form 601 and attachments, the TA monitor will provide a copy of the request to the equipment specialists at the Air Force Engineering and Services Center for functional review. The nature of the items received by HQ AFESC/DEMG usually dictate a fairly thorough review because they represent a high dollar value to the Air Force either as a single item or because of their potential quantities. We are set up to evaluate various proposals and determine the possible benefits to the performance of vehicular equipment-type jobs. Our completed review and recommendations are then forwarded back to the TA monitor who, in turn, will approve or disapprove those items within his authority or forward to HQ Air Force Logistics Command (AFLC/LOWC) those which are not. Those items that are forwarded on to HQ AFLC are usually done so because they are entirely new to the Air Force inventory and their cost is considered much higher than deemed necessary in daily operations. Once the final approved level has been reached in this process, the completed documentation is returned through channels to the CEMO bearing the approval/disapproval decision.

Final approvals of allowance/authorization requests may be granted for inclusion in a regular TA or under a special allowance source code (ASC). These miscellaneous ASCs have special characteristics such as limited life in support of special research or projects. The two most common miscellaneous ASCs utilized for civil engineering vehicular items are 048, Retention Authority, and 041, Special Allowance. These ASCs are commonly used for old equipment and items having very limited quantities or use, respectively.

Thus lie the procedures in establishing both an allowance and an authorization — piece one of the vehicle pie.

The Vehicle Priority Buy System and What Every BCE Needs To Know About It

To explain the actual workings of the annual vehicle priority buy program, let us look at an example of the various steps involved. To begin the example, assume all the allowance and authorization paperwork for a requested asset has already been approved as explained earlier. Normally the BCE and VCO/VCNCO should assure that these actions are completed by the beginning of the buy year. The asset, therefore, will not appear as an initial shortage and should appear on the VOO's recommendations for the base vehicle priority buy submission.

According to AFM 77-310, Vehicle Management, Vol. 1, Acquisition, Management, and Use of Motor Vehicles, and TO 00-25-249, the annual vehicle priority buy will be developed around the vehicle data that exists as of March 15 every year. This cycle is begun with a review of the Registered Equipment Management System (REMS) and Vehicle Integrated Management System (VIMS) data. This data provides information about how old a piece of equipment is, how much has been spent to repair it to date, if there are any items that are due replacement or any unfilled authorizations (i.e. initial shortages as well as a number of other facts about each vehicle in the base inventory). This is a good tool for the VCO/VCNCO to obtain and utilize in determining both present and future CE requirements. A copy should be kept with your squadron vehicle records.

Based on the mid-March vehicle information, the VOO has the responsibility of developing recommendations for the base vehicle buy submission that are in the best interest of total fleet management. Once these recommendations are developed, it's time to convene the base Vehicle Authorization Utilization Board (VAUB).

While all VAUB meetings are important, this meeting is the most important vehicle event of the year so don't treat it lightly. The attendance of the BCE at this meeting is very important for without him present it becomes very difficult to defend CE requirements. The importance placed on your needs is well evident not only by the BCE's presence but also by his well developed background on the issues at hand. It's the job of the VCO/VCNCO to prepare himself and the BCE for this meeting with all the facts at his disposal and then attend the meeting with the BCE to provide further assistance as necessary.

Make sure that all your information is accurate; whatever you use here to defend your requirement will follow it all the way and you don't want to hurt your chances at a higher level by using wrong data.

Once the final priorities have been established by the VAUB and the VOO has developed the final base submission package, be sure you get a copy for the records. From here on in it's out of your hands so be sure you have back-up for the future. It's also a good idea to send a copy to your command DEM staff, especially if there's a hot item of interest you want them to track for you.

From the base, the submission goes to the command transportation office (LGTV) and CEMO for the command consolidation and review. According to regulation, it's due there by July 1, so you can see there really isn't much time to react. Prepare early!

If you've done your job well, then the necessary justification is there to support your requirement at this and higher levels. At this point, the command may drop your requirement from the consolidated submittal so you need to watch for this possibility — again the job of the squadron VCO/VCNCO with the help of your command DEM staff. There may be a good reason for this action (e.g. the fact that the item has already been allocated for your unit); however, this is the information that the unit VCO/VCNCO should have already checked on "cold" before. Another possibility is that an asset has become available from another base or even a different command that will be used to fill your requirement; however, this should have been known before this time, too. If one of these should occur, no harm done, at least not this requirement.

Mistakes in computing requirements can cost in other areas (i.e. another requirement

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you may have given up in order to get this one particular item has a higher priority). Also, the fact that you have just wasted dollar space in the program that someone else could have really used on your base. Remember, once it's at command they make up the priorities for the entire command not just your base. This is why, while the consolidated submission is being put together, it's a good idea for the DEM staff to get involved. They should make sure that the CEMO understands the importance of your hot items; remember CEMOs are not engineers and they don't always know the difference between two similar types of equipment. Remember, too, a MAJCOM is chartered under the same regulations as the base and has a due date of June 1 by which the submission has to be sent to Warner Robins Air Logistics Center. Time at the command level is short so decisions have to be made with what is available; make sure it's right.

Warner Robins ALC is the central manager for all of the Air Force's vehicle fleet and as such is responsible for the development of the total Air Force vehicle buy program annually. Once all the MAJCOM priority buy submissions are received at WR-ALC, the people in the item management division integrate these requirements by vehicle types.

No longer is the program developed just around the five priority categories of the AFTO Form 468, but now it is broken down to the total quantities by priority for each vehicle. Assume for a minute that your base submission was for one dump truck in priority one, two pickups in priority two and a forklift in priority three. This information is integrated at WR-ALC by an item manager (IM), who develops a listing showing how many dump trucks are needed in priority one, how many are needed in priority two, and so on. This same process goes on for each and every item in the inventory and thus the IM can see what trends are developing and how many items are required right away.

With this trend and quantity information, the IMs can prepare their annual figures for the current buy budget and for the five year program budget. In this way they can predict future needs far enough for developing the necessary budget submissions required for congressional approval.

If the efforts of the IMs are fruitful, the approved budget will buy all of the immediately needed items as well as some of the backlog from past periods of less funding. Likewise, however, if funding is so low as not to cover all of the priority one requests, then each command will get an apportioned share depending on their priority one requirements.

This is another place where good documentation can play an important role for it may be impossible to do a critical mission any longer without a specific number of vehicles. In this case the IM at WR-ALC needs to know this in order to make the right decision about distribution of these limited resources. The only way the IM can find out what is more important is to contact the command CEMO and DEM staff who should be able to defend their position based on sound justification that you have already sent up.

Well, so if your item makes the initial cut and is now budgeted for, what's next? First of all, since you last saw that priority buy submission at base level, approximately six months have gone by and it's now September of the year one. Your item is now part of the overall annual vehicle budget estimate submission (BES) and has been submitted for review by the Air Staff, the Office of Management and Budget, and the Secretary of Defense. At the point where the budget has survived a number of reviews and cuts from within the Air Staff, a copy of it is returned to WR-ALC for further action. With this information the IM begins to prepare the individual tentative vehicle allocations to the various commands.

As I mentioned earlier, if their efforts in preparing and defending the budget are successful, then every command should get at least all of their priority one requests. This step in the process takes place around the December/January time frame of year one. This is the information that the VCO/VCNCO needs to be checking on to find out if his efforts have paid off. If they have not, then this information will help in the preparation of the next base vehicle buy submission.

The allocation information that the IM sends to the command CEMO will have to broken down against the base vehicle submissions from the last year and this information passed on to the bases before mid-March. If you haven't heard about your item by this time, contact your command DEM staff for help in tracking it down. Remember you don't want to make a mistake in your submission requirements.

Assuming that your item has made it this far, that you've got a tentative allocation for the particular asset, now what you ask. Well, first of all you're not over the last hurdle yet; that tentative allocation is just that, tentative. This means that if nothing happens to the vehicle budget between now and October first of the second year, then you'll get the asset after procurement. How long that actually takes depends on a number of variables. First, if the congressional budget approval is held up, this pushes the whole process back. Next, is the type of equipment involved (i.e. a bulldozer takes an average of a year to build and deliver whereas a pickup truck only takes three to five months for manufacture and shipment).

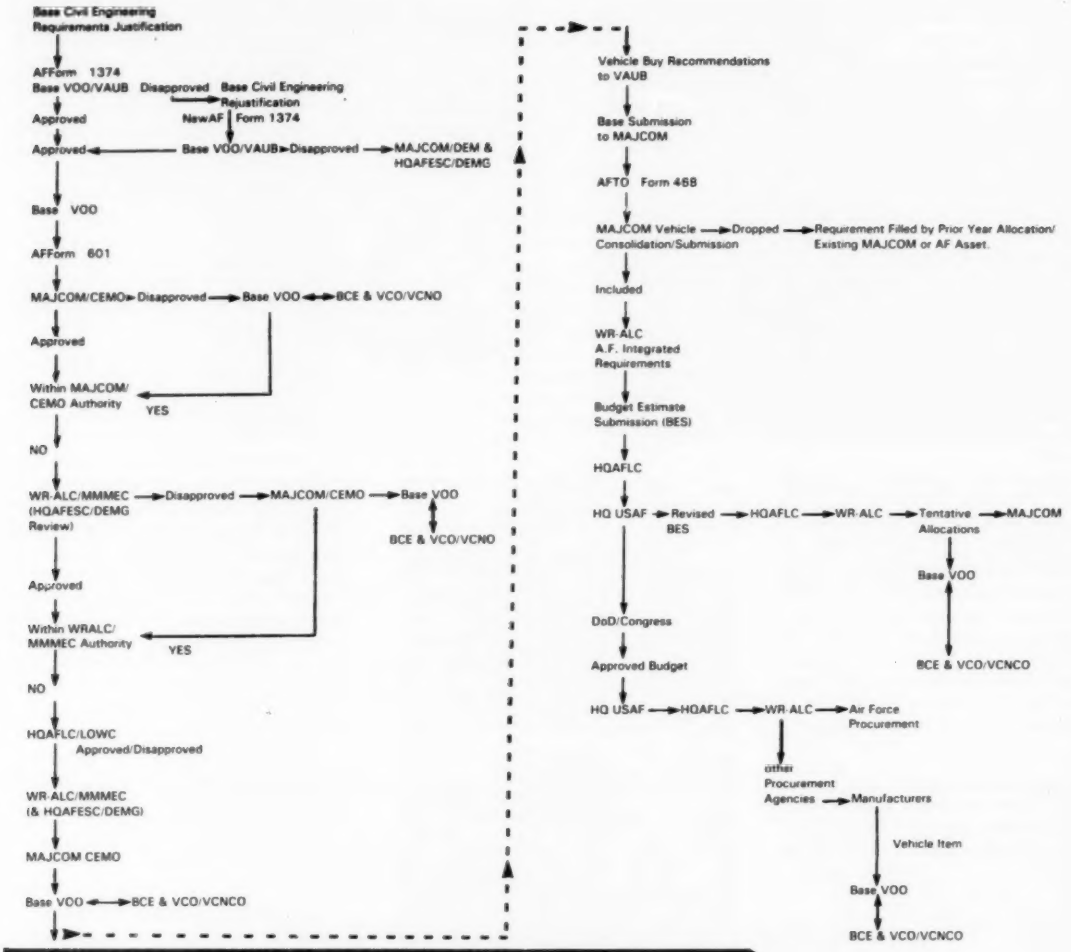
The last factor involved in how long it takes, is how long it takes to establish a signed contract with a manufacturer. This action is governed by the documentation necessary for the procurement such as the specification, the bidding process that the contractors go through, and final awarding of the actual contract. All of this may sound confusing, and it can be. The actual bottom line, however, is that from the time you first identified that new requirement in March of year one and get it in the annual base submission until the time you have an asset in hand will average out to about 28 months. That's a long wait – so you can see why its important for all the paperwork to be correct and to keep track of your requirements.

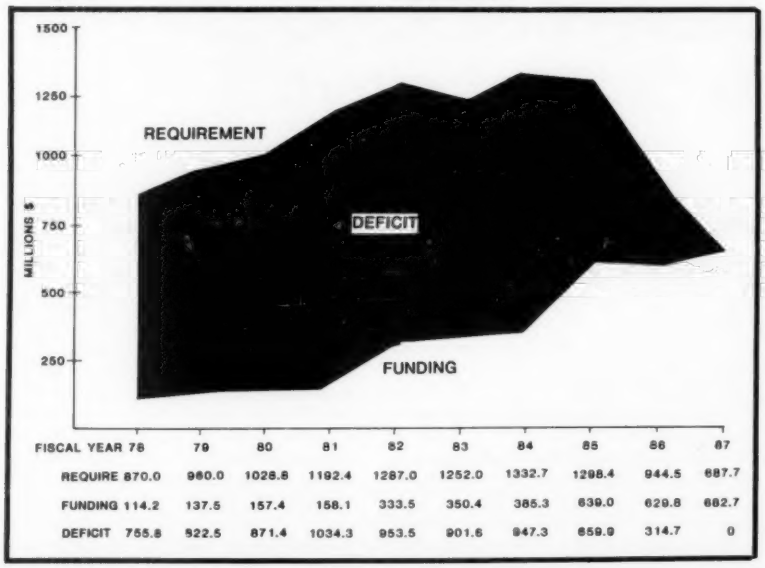
There are some things you should remember that will help keep the waiting to a minimum.

- First, remember to start early to develop a good requirement and justification – don't wait until the week before the VAUB meets to finalize the buy submission.
- Second, be sure of the facts before you waste time on developing something that's already been done.
- Third, be sure to keep a copy of all your actions; things do get lost from time to time.
- Fourth, be ever watchful that something doesn't change during the various steps – if it's not important enough to keep track of then who needs it.
- Fifth, the VCO/VCNCO needs to become familiar with every step of the authorization process at the base level and know who handles that all important paperwork.
- Sixth, the BCE should never miss a VAUB meeting; if he does, then it's a sign that the business is not important to him.
- Seventh, know your CEMO and DEM equipment staff. These people are there to help so don't be afraid to ask.
- Eighth, make sure that important items are identified to your command DEM staff so they can help you and possibly someone else.
- Ninth, look into the future, try and think three years in advance – that's the only way you'll ever have what you need when you need it.
- Tenth, when all else has failed, contact the equipment specialists at the Air Force Engineering and Services Center. There you have them, the ten commandments for the civil engineer to use when dealing with vehicles – piece two of the vehicle pie.

The Vehicle Budget Picture

The vehicle budgeting system is a very complex and lengthy process and it is not the purpose of this article to explain these details. What is important for the civil engineering community to know is how we





FISCAL YEAR	78	79	80	81	82	83	84	85	86	87
REQUIRE	870.0	960.0	1028.8	1192.4	1287.0	1252.0	1332.7	1298.4	944.5	687.7
FUNDING	114.2	137.5	157.4	158.1	333.5	350.4	385.3	639.0	629.8	682.7
DEFICIT	755.8	822.5	871.4	1034.3	953.5	901.6	947.3	659.9	314.7	0

Capt. Robert J. Marshall *is a vehicle and equipment specialist with the management division, Operations and Maintenance Directorate, HQ AFESC, Tyndall AFB, Fla. He was previously assigned as the chief of contracting and environmental planning, Kunsan AB, Korea. He also served with the 820th CES(HR), Nellis AFB, Nev., as an engineering officer and vehicle control officer. He holds a degree in Mechanical Engineering from Lowell Technical Institute, Lowell, Mass., and has done graduate work with the University of West Florida, Pensacola, Fla.*

are doing compared with the rest of the Air Force. Over the last few years the civil engineering portion of the vehicle budget has been approximately 22 percent.

Your next question is, then, if we are getting all of this, then where are the results from it? To answer this question we need to address several areas. First, we all know what inflation has done to our personal buying power and the same is true for the government procurement of vehicles. Costs per vehicle have risen sharply over the last decade hence a decrease in the overall quantity bought. Furthermore, the prices for larger and/or more specialized items have a bigger impact on the available dollars funded each year. Everytime a base generates a requirement for such an item, it means a big bite out of the dollar pie — so being absolutely sure of a requirement is paramount.

The second area that affects us is that the procurement and manufacture time for these items hasn't changed that much in the last twenty years but our daily requirements have. There is more going on today in terms of operations and maintenance on our bases that need attention now. Because of this we are wearing things out faster while replacements aren't coming in any quicker. This is one of the areas where we can help ourselves a lot, by taking a real hard look at how well we treat what we do have.

The third area that has affected what has been available to the base civil engineer has been the increased requirements for support of the wartime readiness objectives. This has meant a large portion of CE equipment has had to be programmed to support such areas as Rapid Runway Repair and prepositioning programs. Thus while much more has been purchased it has been used to fill brand new authorizations in support of these programs and has never reached the average base-level CE community.

The chart of the Air Force vehicle requirements vs funding shows how these two ran almost parallel during the late seventies, but with improved funding projections will close the gap by 1987. This means a reversal in the old vehicle funding trends and by the late eighties a 100 percent replacement of all requirements. However, the chart fails to tell us what happens when there is a cut in the funding projected for these out years, nor does it address any new requirements as yet unidentified for the future. Either of these two alone or in combination can mean only one thing — a delay in reaching this point of equilibrium. Ever since the end of the Vietnam war we have faced a steady bow wave of requirements that funding could not overcome thus resulting in an older fleet.

In the future we can expect many of the same problems to continue. It's doubtful that prices are going to ever go down nor will our roles and missions be reduced. The future, monetarily speaking, doesn't appear to be going to change dramatically, but that is not to say it won't change at all. Recent increases in the vehicle budget can directly be attributed to the emphasis placed on it not only by the transportation community but also by the various MAJCOMs who have developed supportive inputs during budgeting reviews. While it may seem like a never-ending battle, the trend does show signs of improvement. From its high in FY81, the deficit has already dropped $100 million by the FY84 budget. This may not sound like a lot in the face of $1.034 billion, but if we can hold to half of the projected rate of decline we can close the gap by FY90. There you have it — piece three of the vehicle pie.

What does all this really come down to for the BCE in the field? First of all, be sure that you really use everything you have and need everything you ask for; there is no room for nice-to-have items. Secondly, be aware that our actions with regards to the maintenance of the CE fleet will make a large impact on the vehicle deficit figures in the coming budget cycles. Lastly, following the ten commandments in CE vehicle control will go a long way to improving your situation and reducing the delays.

BASE CIVIL ENGINEERS... the "active" effort.

by Sgt. Lea Blake
Associate Editor

The greatest assest in Air Force Engineering and Services is people — 100,000 of them on active duty, and in the Guard or Reserve, and civilian. Their primary task is to defend our nation. Military members and their families in the E&S community live in a world of their own. Recalls at 5 a.m.— overseas deployments — family separations — long work days — and no overtime pay. It's a world of learning, training, practicing and exercizing abilities. All this to prepare and maintain the readiness of a nation towards war.

During peacetime these people carry out that responsibility seven-days-a-week, 365 days-a-year, all over the world. Young adults are trained to be mechanics, fire fighters, civil engineers, hotel operators, electrical specialists, cooks and foresters. Still there are more than 30 trades and professions within the E&S world to fill toward our mission goals. And there are exercises. Prime BEEF, PRIME RIBS, RED HORSE, these are all familiar terms with those in the field.

Yet, while the primary aim is toward defense and readiness, the folks in E&S communities never forget their neighbors. Many trained and skilled professionals in E&S trades take their talents and knowledge into the communities which surround their base — as volunteers — as quick response and helpers in times of crisis.

Here is where skill and endurance are put to the "real world" test.

Engineering and Services people are given equipment for relief efforts and responding to world-wide disasters like floods, hurricanes, tornados, earthquakes, volcanic eruptions, typhoons, massive thunderstorms and blizzards. Most of these occur here in our own backyard and history has proven more than once that our E&S people are more than ready to respond — they're willing and eager.

The following account and accompanying photos cover the story as words could never do. These are the people who are helping their communities in whatever capacity they can when disaster hits. Many bases could not submit for lack of photos or because they weren't hit by any disasters this past year. But just these prove that all Engineering and Services people are ready. The Guard, the Reserves and the "active" commitment is on record...

DECEMBER 2, 1982 — With the dawn

▲ **The 341st Combat Support Group (Strategic Air Command), Malmstrom AFB, Mont., fire department made four rescue runs to accident scenes like this in 1982. Members of the department also aided the local community in battling two fires, one involving two tractor-trailers and the other a farmer's wheat field.**

▲ **A 43-person team from the 3755th Civil Engineering Squadron, Scott AFB, Ill., was sent to help recovery efforts after a tornado struck Altus AFB, Okla., in 1982.**

◄ **Members of the Prime BEEF team at Carswell AFB, Texas, helped the people of Paris after the April 2, 1982, tornado struck.**

came death, an estimated $7.5 million in damages and 49 active duty Air Force people injured. Thirteen were hospitalized and dead was TSgt. George Williams of the 1866th Facilities Checking Squadron at Scott AFB, Ill. The full force of a savage tornado crushed the homes of at least 250 military families.

The tornado swept through the east end of New Baden, the community surrounding Scott. It destroyed a trailer park and apartment buildings where officials estimated 85 percent were active duty military residents.

First to respond to the scene within the hour were disaster preparedness and a medical crew of four doctors and 15 technicians from the base hospital. Air Force volunteers filtered in to keep the nine electrical power generators and six high-power light carts set up and working – the town was in a blackout. Power lines had been destroyed and New Baden would be completely without power for two days.

As the initial shock subsided and reality sank in, base agencies and volunteers began to help. Homeless people needed shelter and food. Homes were found and food was gathered. Those who couldn't help in those ways, volunteered to help find the town's injured and needy people.

"Utter chaos," is how CMSgt. Erwin Mueller described the scene which met him on the morning of Dec. 3. The chief, a structural superintendent with the 932nd Civil Engineering Squadron (AFRES), was traveling to Scott AFB from his home in Murphysboro where he works for the postal service. He had heard about the disaster on his car's citizens band radio. "By 7 or 8 a.m things were coming around and the people were coming out of the woodwork to respond," Chief Mueller said.

A call from Col. Earl Fairchild Jr., 932nd Aeromedical Airlift Group Commander to Headquarters 14th Air Force, gained approval for the reserve unit to respond and set the stage for the cleanup effort.

On Dec. 4 the workhorse moved in. More than 100 reservists from Scott began to dig out from the devastation of the tornado.

Reservists from the 932nd CES, Consolidated Aircraft Maintenance Squadron, Communications Flight, 52nd Medical Service Squadron and the 73rd Aeromedical Evacuation Squadron, worked alongside volunteers from the local area and active-duty members from Scott to get the job done.

"Our people had smiles on their faces all weekend because it is self-fulfilling to be able to go out and help people in a situation like this," said Colonel Fairchild who is a technician at Scott in civilian life.

Lieutenant Col. Richard C. Hartnagel, 932nd CES commander said, "The cleanup in New Baden was similar to the wartime mission for which this unit is trained – repairing bombed runways and facilities after an attack." In comparison the colonel continued, "It would have taken an awful lot of bombs to do that much damage."

Colonel Fairchild summarized the weekend by recalling the words of a young airman after the effort, "'I moved a house today,' the airman said wearily, 'but now I can't even move my boots.'"

THE INDUSTRIAL ENGINEER AS A CHANGE AGENT.

by 1Lt Jerry P. Haenisch

What is the purpose of the Industrial Engineer? IEs don't design construction projects or manage in-house work, and quality control is the responsibility of the foremen and superintendents. So what do they do?

The base civil engineer may ask, "The IE monitors the results of the Quality Evaluation Program and points out trends in reports from Data Automation, but do I need an engineer for that?" Such questions are valid, and each industrial engineering section needs to be able to answer its BCE with facts and performance. This article describes one answer that works for the Air Force Academy. Before the details of the performance, however, there must be a rationale for the very existence of a professional IE staff.

L. A. Seder, in the ***Quality Control Handbook***, Juran, section II, outlines several concepts that provide a useful insight into the IE function:

1) Staff Assistance – collection and analysis of data requires certain attributes not usually found in line supervisors.

a. Time – because civil engineering operations are complex, data collection and analysis takes substantial amounts of time. Someone in the organization must be alloted the time specifically or the analysis will not be done.

b. Objectivity – the person looking for "facts" cannot be the person who already "knows the answer." An "outside" investigator who is not too close to the data is needed.

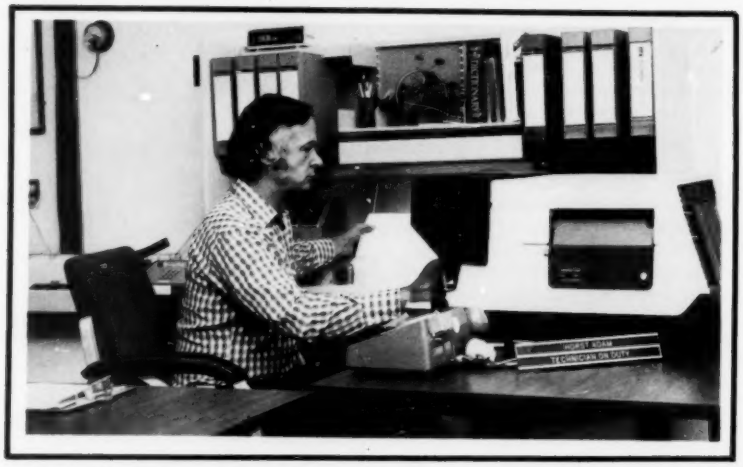
c. Statistical Skills – facts, information, and data must be ordered in a reasoned and systematic manner to enable valid analysis and conclusions. IEs are trained in such methods.

2) Breakthrough in Knowledge – Higher levels of productivity require higher levels of knowledge. Most new knowledge is the result of an organized search. Civil engineering provides the means for systematic search through its Industrial Engineering section.

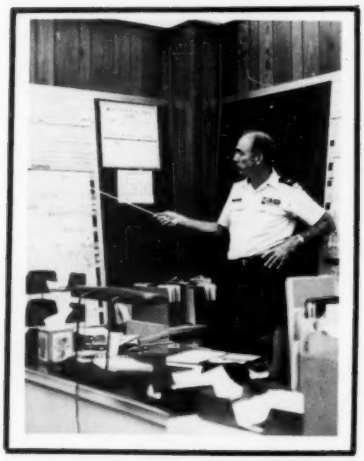
3) Separation of Vital from Trivial – In a variation of Pareto's rule: A few defects or nonproductive policies result in the majority of losses in productivity. IE efforts are aimed at identifying and correcting those few most important areas.

With these concepts in mind, Col. Dibrell Stowell, deputy chief of staff for Civil Engineering at the Air Force Academy, reinforced the mandate given to his industrial engineer. Colonel Stowell said, "Seek out opportunities for productive change and then facilitate that change." William C. Winter, director of industrial engineering, took up the challenge

. The first step was revitalization of the squadron's Management by Objectives



ABOVE: Energy Management and Control System operator, Horst Adam, uses a video display terminal to check on operating conditions in the mechanical systems.



LEFT: SMSgt. Fred Dangerfield, chief of Production Control, briefs at the Commander's Update meeting.

(MBO) program. The program combines result-oriented goals with detailed action plans for each goal. Monthly staff meetings help shape the goals and, most importantly, provide a format for clear communication of each directorate's plans. MBO initiatives also help establish an attitude of change within the organization. Such an attitude is crucial where innovation and developmental growth are desired.

Mr. Winter's next action was establishment of a practical management assistance program. This assistance activity, known as Cost Center Review, is the core of the IE operation at the Academy. Unlike basic quality control checks or typical inspections, these section reviews are structured to assist the functional manager. An outline of the usual cost center review procedure will illustrate its function.

Preview Stage

The IE analyst reviews the operational interpretation of the section, then looks at present manning, operational costs (BEAMS reports), and any previous inspections or reviews of the section.

During this stage, background interviews are held with each level of management above the section in question. Typically, this includes the chief of operations and maintenance and superintendent level. At these interviews top level concerns or ideas are identified. This helps to narrow, somewhat, the scope of the Cost Center Review.

Finally, in the preview stage, other sections that interface with the shop being studied are interviewed. These interviews bring out any particular problems or unique activities that affect the squadron in general.

Note here that these interviews bring most of the squadron's major activities into each cost center review. This aspect of the Cost Center Review helps keep the IE in touch with the organization and brings out good ideas or solutions to minor problems at an early stage of development.

Review Stage

At this point, the reviewer works directly with the section supervisor. Through the standard techniques of observation, questioning, and listening, the IE analyst determines the present condition or mode of operation of the section.

With a basis established and documented, the next step is critical analysis. This is a joint effort between the supervisor and the reviewer. Key questions asked are:

- What should the section be accomplishing?
- Why are the present methods in use?
- Is there a better way?
- What must be done to change to a better method?
- Who needs to change their methods?
- What will be the consequences of any changes?

Of course, the section supervisor is the primary source of ideas for productive change. The IE role in most cases is to focus such ideas and facilitate the necessary changes.

When the interviews, data collection and analysis have been completed, initial recommendations for change are developed. An outbriefing is held with top managers, from the BCE down. At the outbriefing, the details of the review are presented to all concerned and people are given direct responsibility to implement approved changes. Also, time constraints are set for their actions.

Follow-up Stage

The final report for each cost center review contains full documentation of the findings and recommended actions for change, along with the people responsible for implementation. The report also includes a time constraint for follow-up action. MBO goals are usually established for each action required. This provides a means of tracking the results of the review.

Further follow-up and refinement of changes are realized in subsequent reviews of other related sections, since each review involves a global look at the entire situation.

The usefulness of the cost center review process extends beyond its function as a change mechanism. It also provides an important communication link within the organization. The IE section becomes a central point or nexus through which good ideas can be distributed to each area of the squadron. Organizational policies are given common interpretation, because the cost center reviews permit top management interaction with each section. Finally, the reviews are an ideal format for recognizing outstanding performance and bringing such performance to the attention of top management.

If you've read this far, you are probably asking yourself, "But how much time do these reviews take?" Or you are asking, "It sounds reasonable, but what are the real results?"

A lot of time must be spent on cost center reviews. Remember that each review incorporates a check of most of the squadron's support functions. These include material control, vehicle control, safety, customer

service, administration, planning, and the first sergeant. Total time for a review could range from one-to-three months, but it is often possible and profitable to engage in two reviews concurrently. The important fact is that the IE is actively engaged as a change agent working toward productive improvements.

The BCE should expect results. At the very minimum, one should notice a clear improvement in squadron communications. Further, our experience has shown an increase in morale within the sections reviewed. One reason for this is the attention given to the section. The personnel involved are asked their opinions; their ideas are solicited and acted upon. A lot of frustration is eliminated just by showing that someone is interested.

The most dramatic results are in productivity. Most Civil Engineering organizations are faced with a backlog of work. In such cases, new equipment, changes in working methods, and new approaches to routine work and recurring maintenance can help relieve some of the backlog. The cost center reviews focus on these initiatives and help the supervisor implement them.

Much of the traditional IE work is incorporated into the cost center review process. Reviewers must be in close contact with supply, manpower, and transportation. BEAMS reports are monitored as part of the preview stage of each review, and because a review is always in progress, the reports are being continually monitored. Since the reviews help identify problem areas, the IE does focus on the squadron's needs.

Being closely involved with the shops makes promotion of the Quality Evaluation program (AF Form 1255) a relatively natural matter. The same is true of monitoring the Engineered Performance Standards. Once again, the key to the cost center review program is that it keeps the IE actively involved in helping to make productive changes within the squadron.

Now, the challenge is to get the program going. First, make sure that the IE personnel themselves know the purpose of the cost center reviews. It is a program aimed at helping the squadron change for the better. Not only are needed changes identified — usually other persons in the squadron already know what is wrong — but, the IE helps develop new systems that the shops can live with.

When the IE plan and concept of the reviews are clear, brief the program to all concerned, especially the chief of O&M and superintendents. Ask managers to provide a priority schedule of sections they'd like you to look at.

Be sure the written reviews don't become discrepancy reports. The review should describe the operational effectiveness of the section at the start of the review; detail actions taken during the review; and outline plans for further improvement.

At the Air Force Academy, the Cost Center Review program has been in place for almost two years. It works. The reviews have proven their usefulness. The task ahead is to continue to refine the process and adapt future reviews to meet the changing needs of the squadron.

First Lt. Jerry P. Haenisch is now chief of the Energy Management Office, 7625th Civil Engineering Sq., USAF Academy, Colo. He previously was chief of Industrial Engineering Analysis there. A 1978 graduate of the University of Maryland (summa cum laude) with a bachelor of science degree in Management, he also earned a second baccalaureate degree in 1980 in Industrial Engineering from the University of Illinois under the Airman's Education and Commissioning Program (AECP). He is an engineer in training in Illinois and a member of the Society of American Military Engineers.

ABOVE: Joe Malsan and Ruben Navarro interpret products with emphasis on consistency and accuracy.

IE

REORGANIZATION SET FOR COMPLETION SEPT. 30, 1983

Reorganization of civil engineering's Industrial Engineering function is scheduled to be complete by Sept. 30.

Started last Oct. 1, the reorganization is designed to streamline the IE function, make the IE more responsive to base civil engineers, and sustain the professional integrity of the IE.

Miles D. Gray, Air Force Engineering and Services Center, Tyndall AFB, Fla., is the monitor of this project. He said that two key changes have already taken place. Cost Accounting and Real Estate have already been realigned in the BCE function; Cost Accounting has been merged into Financial Management; and Real Estate assigned to Engineering and Environmental planning.

Research during the two-year study phase of the IE reorganization indicated that Cost Accounting and Real Estate were not direct functions of the IE and would be better assigned elsewhere. Research was done both in-house and by contractors. Researchers said there was a need for increasing IE utility in the more traditional roles of studying better ways to do work, improving productivity and quality.

"The purpose of the reorganization is to provide the IE with dedicated time to perform pure IE studies and analyses. This will lead to better and more productive use of the BCE resources resulting in improved productivity and quality of services," said Gray.

With the reorganization comes a more stringent set of criteria for IE positions, an insistence on academic and professional status, and a stronger professional role in the BCE organization.

CESMET tips

The Air Force Civil Engineering and Services Management Evaluation Team (CESMET) reviews, evaluates and assists base civil engineering and services functional areas in accomplishing their mission in the most effective and efficient manner. This department is designed to pass along new ways to do the job better.

We present certificates of outstanding achievement to base personnel who are doing absolutely "Top Notch" work. Here is a list of the latest recipients:

- **TSgt. James Richards** — Castle AFB, Best SMART Supervisor
- **Best Team Effort** — Fire Truck Maintenance, Castle AFB
- **MSgt. Gary Garber** — Kirtland AFB, Best VCNCO
- **Best Planning Section** — Kirtland AFB
- **A1C Denise Pinuelas** — Kirtland AFB, Prime RIBS NCO

Budget

Effective financial management requires total involvement with the overall funding situation and in-depth knowledge of the organization. While funds managers generally have a handle on all aspects, we often find that the assistant has not been given the opportunity to learn the "Big Picture." We feel this often results from the grade structure within the office which does not allow upward mobility for the assistant. The ability to train "in-house" and promote from within provides continuity and stability for the organization. During our visit to Moody AFB, Ga., we saw, for the first time, a two-person funds management office that has this capability. Management's involvement and assistance from the classification section within the Civilian Personnel Office were needed. A well written position description is essential. For some tips on how they did it, call Ms Catherine James, DEU, AUTOVON 460-3830.

Engineering Design

Specialized short-term base level engineering design assistance is often difficult for the chief engineer to obtain. Chanute AFB, Ill., showed us a way to resolve this situation, however, and many other bases may be able to use the same approach. Design personnel at Chanute, using procedures allowed under the Intergovernmental Personnel Act of 1970, "hired" a landscape architect from the University of Illinois for a two-month period to perform a specialized project. Civilian Personnel Office approval and payment provisions are relatively easy so there is very little "hassle" involved. Call Ralph Mitchell at Chanute AFB, AUTOVON 862-2375 or CESMET at AUTOVON 970-6115 for more information.

Positive Approaches to Food Service Management

Every aspect of the food service program revolves around proper management. Management of time, money, resources, and (most importantly) people, play an important part in completing each task. Good management and teamwork among all military and contract personnel must exist if your food service operation is to run smoothly. Some approaches to positive management are as follows:

- AF Form 1038, Food Service Evaluation Record, is an excellent management tool which allows managers to evaluate themselves in all areas of food service. Periodic use of this evaluation system is recommended for use in all phases of operations.
- Food preparation. The preparation of quality food products is the single most important aspect of the food program. All other parts of the operation are centered around the products being prepared. No amount of merchandizing, administration, or courtesy can ever overcome a poor quality food product. It is management's responsibility to encourage use of recipe cards, proper adherence to AF Form 662, Food Service Production Log, and customer feedback to ensure top quality food.
- Equipment. The importance of proper food service equipment cannot be overstated. Continued effort should be made at all levels to obtain needed items and to install or repair items on hand. Managers and appropriate staff must define the purpose and actual need for equipment and consider all possible alternatives. Then, compare individual performance, capacities, sizes, and other features. All equipment, large and small, must be properly maintained, used for intended purposes, and repaired quickly and effectively. Keep in mind your production is directly proportional to the continued operation of your equipment.
- Training. If operations are to meet daily goals, training is an absolute necessity. It involves more active commitments and assistance from senior managers. On-the-job training in cooking skills, merchandizing and customer relations is extremely important. Managers should take advantage of food service training films, classroom instruction, and daily proficiency training. Active involvement is the key to productive and efficient people who produce consistently high quality meals for customers. Managers should stress the training to assure skill progression and supervisor progression. Involvement in all training provides a direct return to senior managers through increased management utilization. It works!

There is nothing complicated about these management approaches. All we have to do, as managers, is take the time and interest to be actively involved in the daily operation. Be a manager. Take charge of the operation. Know the status of resources. Know the mission workload. Know the game plan. Measure performance and take corrective action as required.

Directorate of Engineering and Services

Current Emphasis

a brief commentary on significant developments

CHECK RUNWAY LIGHTING AND MARKINGS BEFORE REVIEW –

Recently, an installation completed a Civil Engineering runway pavement repair project involving the overlaying of the middle 150 feet of an existing 300-foot runway. Appropriate runway side stripe markings were made in accordance with AFR 88-16, but the existing runway edge lighting system was not moved in to within 10 feet of the new runway edge (required by AFR 88-47, para 3-2a). Approximate shoulder markings were also not installed per AFR 88-16, para 5-3. Engineer managers reviewing runway/taxiway pavement resurfacing projects should ensure that correct airfield lighting and marking criteria are implemented during runway/taxiway pavement projects. (AF/LEEEU, Mr. Aimone, AUTOVON 297-4082)

WHAT'S NEW IN LAUNDRY & DRY CLEANING –

$4 million worth of equipment was capitalized on Oct. 1, 1982; depreciation expenses are approximately $35,000 monthly. The five year equipment replacement plan will enhance productivity and lower prices to all customers. (AFESC/DEHS, Mr. Mauldin, AUTOVON 970-6180)

AIR FORCE HISTORIC PRESERVATION WORKSHOPS –

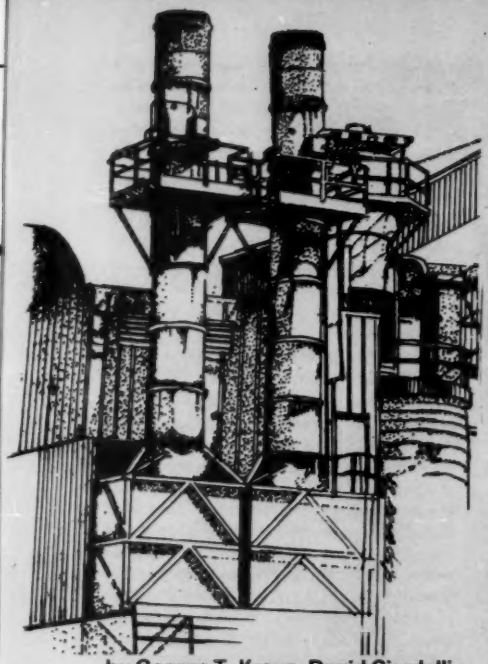
The Air Force Engineering and Services Center's Environmental Planning Directorate and Staff Judge Advocate are planning a Historic Preservation legal guidelines workshop for major command and Air Force regional civil engineer personnel April 20-21, 1983 in the Pentagon. The second Air Force Historic Preservation Workshop for installation and major command historic preservation officers is being scheduled at the College of William and Mary, Williamsburg, Va., in June 1983. For more information contact AFESC/DEV. (AFESC/DEV, Ms Scott, AUTOVON 970-6236)

HQ AFESC REQUIREMENTS AND PRODUCT MANAGEMENT DIRECTORATE –

The Air Force Engineering and Services Center will establish a Requirements and Product Management Directorate this summer. The new directorate will combine the Requirements Division from the Readiness Directorate with a newly formed Product Management Division from the Engineering and Services Laboratory. The mission of the new directorate will be to identify engineering and services requirements and to ensure a coordinated acquisition and distribution process for products that satisfy those requirements. (AFESC/RDCR, Maj Bretz, AUTOVON 970-6295)

PRIME BEEF SOUND-ON SLIDE CATALOG NUMBER CORRECTION –

The "Prime BEEF Training Update" article on page 6 of the Fall 1982 (Vol 23, No. 3) edition of the ***Quarterly*** incorrectly listed the catalog number for the sound-on-slide training package, "Load Planning CF-2 Team Tool Kit." The correct catalog number is 600041CF. Your base audiovisual library should be able to get a copy from DAVA, Norton AFB, Calif., about April 1983. Another sound-on-slide package 53361DF-2, "MOS Selection – Part II" was completed and forwarded to DAVA for production at the end of January. It should be available for distribution in May 1983. (HQ AFESC/DEOT, Maj. McCluskey, AUTOVON 970-6130)



Meeting a serious environmental challenge...

Resource recovery at Pease

by George T. Kraus, David Ciardelli and Freddie L. Beason

Pease AFB, N.H., along with its community neighbors, faced and met a serious environmental challenge with a unique third-party contract solution that provides safe refuse disposal and resource recovery. The solution is a refuse-to-energy incinerator located on Pease AFB. It is funded, constructed, and operated by the City of Portsmouth. It is now in operation satisfying a significant portion of the base heating requirements.

Background

Pease AFB formerly disposed of its municipal-type solid waste in an off-base sanitary landfill operated by the City of Portsmouth located in North Hampton. The City of Portsmouth, the towns of New Castle, Newington and North Hampton, and Pease AFB used this landfill, which was rapidly filling with no relief in sight.

Pease AFB is located in the southeastern coastal region of New Hampshire and it is surrounded by the New Hampshire communities of Portsmouth, Newington, and Greenland. The base is in close proximity to many other small towns in the southern part of Maine, and the southeastern part of New Hampshire. This fact facilitated a regional approach to solving problems of mutual concern.

Pease AFB generates approximately 4,000 tons per year (12 tons/day) of municipal-type refuse from over 1,200 family housing units, dormitories and officer areas. The refuse was collected and hauled by contract to the regional landfill, a distance of seven miles.

The City of Portsmouth and the othe towns utilizing the landfill account for approximately 100 tons-per-day waste. The search for an environmentally acceptable refuse disposal method soon focused on refuse-to-energy plant as the least costly, long-term solution. Even though Pease AFB generates only 12 tons-per-day of solid waste it became an essential ingredient in a refuse-to-energy system — a user with a large central demand for heat.

Pease AFB Central Heat Plant

The Pease central heat plant (CHP) operates on a 365-day-per-year basis. The CHP provides high temperature water (HTW) for all the major base buildings, excluding the hospital and 1,211 military family housing units. Demands range from 20 million BTUs (MBTU) per hour in summer to over 110 MBTUs in peak heating season. In any one year, the CHP uses the equivalent of 3.5 million gallons of oil. Natural gas and No. 6 oil are fuels for the plant.

The system is basically closed, consisting of loop circuits from the boiler to the heat consumers and returning to the boiler. Pumps are installed in the circuit to force circulation. The average water supply temperature is varied between 325 degrees F in the summer to 370 degrees F in the winter. An expansion tank is installed to permit expansion and contraction of the water volume as a result of minor fluctuations in average water temperature. This tank is also used to maintain a nitrogen cushion at a pressure in excess of the saturation pressure of the water to prevent the hot water from changing into steam.

Refuse To-Energy Concept

After two years of study, the City of Portsmouth proposed to design, construct and operate a refuse-to-energy plant. It would be located on Pease AFB and would provide heat to the central heat plant. This would reduce the need for fossil fuels. Pease AFB would purchase the energy from the City of Portsmouth, and reduce overall operating cost to the refuse-to-energy plant. This, in turn, would provide a lower cost for solid waste disposal of member towns. Total capacity of the proposed plant would be 200 tons-per-day (TPD), seven days per week. The plant would supply up to one-third of the heating requirements for the base. Portsmouth, North Hampton, and New Castle as well as Pease AFB, would dispose of their waste in this manner. Other communities facing similar solid waste disposal problems would be allowed to utilize the plant to allow for full capacity use.

The project would be wholly financed by a City of Portsmouth bond issue. In turn, the city wanted a guaranteed long-term energy contract or a buyout agreement.

During 1978 and 1979, the 509th Civil Engineering Squadron sought higher level approvals for this unique concept. A Memorandum of Understanding was signed between the city and the Air Force agreeing to the concept in principle. The MOU was staffed through the Office of the Secretary of the Air Force. In March 1980, the city requested proposals for a 200 TPD refuse-to-energy plant.

Contract Negotiations

It took one year to review, evaluate, and refine these proposals, and to finally select Consumat Systems, Inc. to accomplish the project. There was a good faith effort by the city which did this without a firm agreement from any town or the base to provide waste or to use the energy.

In the next year, three formal agreements were negotiated by the Air Force and the city. The first was a 25-year land lease negotiated by the U.S. Army Corps of Engineers. The second was a 10-year refuse disposal contract and the last was a 10-year energy purchase contract. The formal contracts were negotiated by the 509th Bombardment Wing contracting officer. A special consideration was the importance that the provisions of these latter two contracts are compatible with each other.

The contract was written to motivate the contractor (City of Portsmouth) to operate the plant efficiently and continue to look for more efficient techniques and additions to incorporate into the plants. This was done in four ways:

a. Meters to measure the amount of steam generated should be located as close as possible to the point where the HRI supply line ties into the base distribution system. This encouraged the city to design an efficient system. A steam quality meter should also be installed if steam quality is important.

b. Each agency that uses steam or dumps solid waste pays for the service. Even though the City of Portsmouth owns the plant they have to pay a tipping fee. If the city dumped at no cost, they would

pass the cost of operation onto the other customers and have no incentive to operate the plant efficiently. (How revenues from projects are split will be discussed later.)

c. Allow the city to recoup capital improvements to plant before the plant operating profit is divided. An audit trail for each capital improvement should be maintained separately.

d. Revenues from operation of the plant are audited at the end of each year. General operating costs are deducted from the total revenues first. Then capital improvements are deducted. The remaining revenues (if any) are split on a 60-40 basis (60 percent to Air Force and 40 percent to the city). The Air Force share is divided by 12, and 1/12th is credited to the Pease bill each month over the next 12 months. The city can use their share to pay their solid waste disposal cost or to fund any other city projects. It is estimated that 87 percent of the revenue from the plant will come from steam sales and 13 percent from tipping fees.

The contract contains an amortization schedule to cover a construction cost of the plant, should the Air Force decide to terminate the contract early. Twenty years is probably the desired life of a contract at another base, although the Pease contract is for 10 years. The Codification Act of 1982 (PL97-214) authorizes the government to enter into up to a 30-year contract for the purchase of energy.

The rate charged for the steam was related to the cost of fuel used to generate the steam in the Pease AFB central heating plant. The steam rate was set at 90 percent of the Air Force's estimated cost to produce the heat with number 6 fuel oil.

Assumptions used to determine Air Force fuel cost:

a. Plant operation at 80 percent efficiency.

b. Air Force stock fund experience was used as price of number 6 fuel oil.

c. Local delivered price of natural gas was used.

d. Number 6 fuel has 148,830 BTU to the gallon.

e. Six point seventy-two (6.72) number 6 fuel oil = 1 million BTUs or 8.4 gallon. Number 6 fuel oil = 1 million BTUs (after plant efficiency included).

The Air Force share of the savings should not be included as part of the rate schedule. The contract should also provide for the rate to be charged based upon a fuel change (i.e., number 6 fuel oil to coal) in the central heating plant. This will assure the Air Force always gets steam from the HRU at a rate less than we can produce it. The Pease AFB contracts provide that for the first year the steam will be paid at 100 percent of the Air Force cost to produce the same amount of steam, with the 10 percent over payment to be credited to future years' bills. This gives the city up front capital to operate the plant and start paying off the bonds.

Savings in the operation of this plant can come from three avenues.

a. More efficient operations methods.

b. Technical improvements to plant that will increase energy production, i.e., new heat exchanged.

c. Plant enhancements, i.e., cogeneration, metal reclaim, etc.

The contract contains the following provisions in addition to the standard utility contract provisions:

a. Step-by-step steam billing methods.

b. All transactions are subject to Air Force approval.

d. The contractor obtains all permits.

e. The contractor pays for connecting to the base system.

f. Rates are determined according to AFR 91-5.

g. Utility costs are reimbursed to the government for operation of plant.

h. Air Force gets the benefit of best rates available if plant has variable tipping fees or steam costs.

i. A change of rate clause.

j. The contractor pays for capital improvements.

Construction

Actual groundbreaking for the plant was in summer of 1981. The city provided a full-time construction inspector who also acted as liaison between the base and the contractor. Construction took one year to complete. Extremely close coordination was required during construction especially during utility tie-in's including the interface with the CHP. Construction was completed in June 1982 with initial start up in July 1982.

Operation

The central heat plant picks up energy from the Portsmouth refuse plant via a steam-to-hot water heat exchanger tied into the main return line to the CHP boilers. The piping arrangement allows for either series or parallel operation of the heat exchanger and the boilers.

During the summer when the output from the refuse plant more than meets total base demand the hot water flow from the heat exhanger can be routed directly to the suction header, completely by-passing the CHP boilers. In the winter when the base demand exceeds the output of the refuse plant, series operation is necessary with the CHP boilers contributing the difference.

The operators of both plants have had to learn how to operate each plant to get the most benefit from the system as a whole. Sometimes, this meant allowing the supply temperature to "float" with the output of the refuse plant. Our operators have also had to learn to compensate for sudden and frequent drops in supply from the refuse-to-energy plant. A hot line phone connection was installed to facilitate immediate communication between the plants. Often times the "Red" telephone is not rapid enough during equipment failures.

Thought should be given in future installations to duplicate the HRU monitoring controls systems in the central heat plant in addition to a phone line connection.

The first winter's operation should provide much more performance data on equipment and personnel alike. Through October the base has purchased a total of 51,243 MBTUs.

Summary

A third party refuse-to-energy contract is not a panacea for all refuse disposal problems. However, under the proper circumstances, the results are worth the effort.

TABLE I

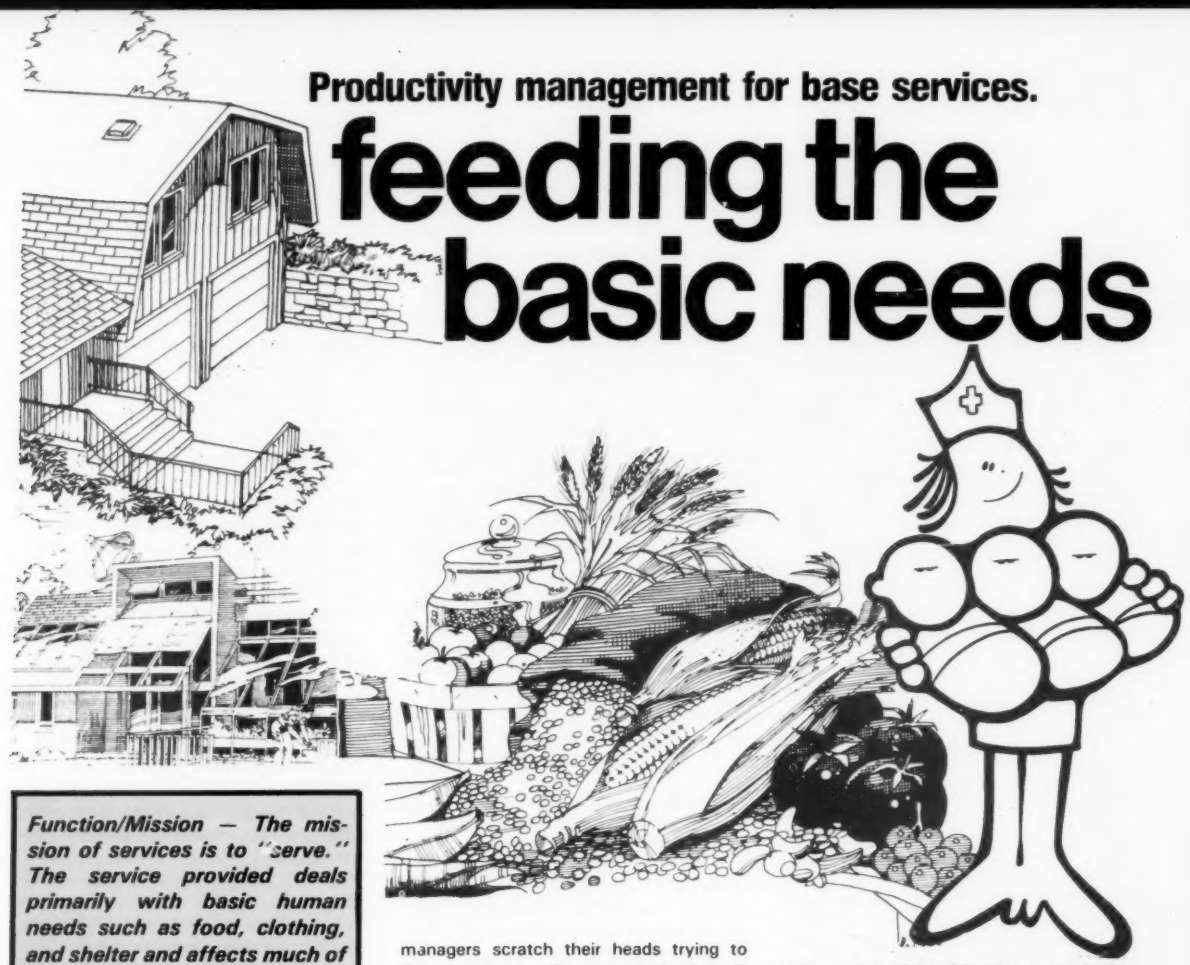
Pease/Portsmouth Energy Recovery Facility Purchase Energy (MBTU)

July	August	September	October
7,696	13,971	13,345	12,231

This is slightly below initial contract requirements due to a warmer fall and lower hourly output of the incinerator.

Productivity management for base services.

feeding the basic needs



Function/Mission — The mission of services is to "serve." The service provided deals primarily with basic human needs such as food, clothing, and shelter and affects much of the military community, including family members. The ultimate mission of the services organization is to provide those basic needs in support of the overall base mission through appropriated fund airmen dining halls, flight kitchens, transient quarters, furnished dormitories, linen exchanges, mortuary affairs support, and possibly dormitory management and a laundry and dry cleaning plant.

by Maj. Charles H. Winkleman and Capt. Walter T. Kelly

The word ***productivity*** is used quite freely every day. Newspaper headlines address the "lagging productivity," business magazines write of ways to "increase productivity;" economists point to "lower productivity" as a cause of inflation; and managers scratch their heads trying to figure out how to "improve productivity."

What is all the hoopla over productivity? What is productivity and productivity improvement? How can productivity be improved in a services organization?

"Productivity is expressed as a ratio of output divided by input. Output is the product or service produced by a company or organization. Input consists of the resources necessary to produce the desired output."

Even with a seemingly simple definition, productivity is much more difficult as a management problem. First of all it is not easy to measure productivity because both output and input may vary widely. Many key variables are not quantifiable. In the services business we have the added difficulty of even using the simple ratio of output divided by input = productivity. This is because our output is not obvious in all cases. For example, in a billeting operation what is the output? Some might say it is the number of beds made or rooms cleaned, another might claim the output is the sales generated; while someone else wisely declares it is the number of people registered. Although all of these are closely related to the actual output, none of these factors are the true output in a billeting operation. The true output is a service provided that is courteous, prompt, and includes clean, nicely furnished rooms with available toiletries and other amenities that make Air Force VOQs/VAQs comfortable.

These examples apply in most services functions. We are not providing a product but a service. In mortuary affairs the output is not the number of remains shipped and buried, but the total service provided, from recovery through military honors and completion of summary courts actions. The same is true in food service. The output is not the number of meals prepared or customers served but the total service provided.

To better illustrate this last point let us assume that meals prepared is the output for a food service operation. Assume your productivity goal per day is 250 meals using 64 manhours. The 250 meals served

is the output and the 64 manhours is the input. Using the formula that productivity equals output divided by input yields a productivity ratio of 3.9 meals per manhour expended.

This ratio could be expressed in other ways. We could have said the manhours in terms of the cost per-manhour or even combined a labor cost input with the cost of food and supplies needed to produce each meal. In these instances we could express productivity as a ratio of the number of meals prepared to each dollar spent. We could even express the output in dollars (i.e. cash receipts or sales). Then the productivity would be stated as one dollar spent (input) yields so many dollars in sales (output).

With this explanation of expressing productivity in mind, let us get back to our example of meals served as the output where the average productivity for the dining hall is to serve 3.9 meals for every hour of labor. Assume today is an average day. The dining hall will serve 100 meals for lunch. The dining hall uses no more than 25.64 manhours to prepare and serve the meal and clean up. The dining hall has met the productivity goal by serving 3.9 meals per manhour exerted.

Now let's look at the meal a little closer. Assume you are the customer on this hypothetical day. You enter the dining hall foyer. The first thing you see is the menu board. It has letters scattered all over, but it doesn't tell you what is on the lunch menu. That's okay, because the menu was printed in the base newspaper. You know that today's lunch choices are pork slices and chili mac. The dining hall has that every Tuesday and today is Tuesday. You approach the cashiers stand. The cashier is reading a newspaper. You speak and get a grunt in response. You lay your $2 on the counter for your $1.50 meal and begin signing the AF Form 79. The cashier finally puts the paper down, looks at your $2 and glares at you. She curtly says, "You know the lunch meal is a dollar fifty. I don't see why you guys can't bring the exact change."

You pick up your 50 cents and head for the serving line. Oops! Where are the pork slices and chili mac? The dining hall is serving the barbequed beef tips and baked chicken leftover from last night. That's all right though, it will go with the wilting tossed salad left from yesterday's lunch. We won't address what the line server was doing, or the fact that the milk was out and the carbonated beverage mix was improper, or the fact you had to move some trays to find a table to sit at to eat stone cold chicken.

You have the picture now.

What has been demonstrated is the fact you can try and establish a level of productivity considering quantitative measures (meals served), but there are qualitative aspects that must be considered in services. The environment, employee attitudes, customer relations and more must be taken into account. This is not to discount the value of quantitative evaluations. These measures do indicate the level of task completion. The services manager must control these tangibles (such as number of meals served or rooms cleaned) in order to positively affect the overall output.

This brings us to the reality of the whole productivity problem in the services business. We may be able to billet more people, exchange more sheets or increase food sales but, if the customer is not satisfied or has not received the service, then we have not done our job.

The second big problem now leaps out at us. What are the qualitative standards in each services functions and how do we quantify them? Quite bluntly, we cannot measure quality objectively. What is polite, tasty, comfortable or clean to one person may not be to another. Even before we can measure standards or service, we have to define what those standards are. That, too, is subject to a variety of opinions. Therefore, our emphasis should be on improving productivity rather than measuring it.

What Is Productivity Improvement?

High productivity means accomplishing more work with no increase in resource use. This means an improved level of service (output) will be provided at the same level of input (labor, material, time, etc). Productivity improvement can also be stated in terms of maintaining the same level of service but reducing the amount of input.

In order to increase or improve output with the same level of input or to maintain the same output level with a reduction of input requires the ability to perform the tasks necessary to efficiently produce the desired output. Productivity improvement also requires us to organize the entire work accomplishment process so that the results are effective in supporting the base mission. Productivity, in this sense, does not mean working harder or faster — it means working smarter. Your unit's productivity depends upon your ability (capacity) to find ways to do a better job or provide a higher level of service with what you have.

Productivity improvement requires management attention to improving both efficiency and effectiveness. Efficiency means the competent accomplishment of a job with a minimum expenditure of your resources. Effectiveness means that the completed job satisfies its intended purpose. The concept of productivity combines both efficiency and effectiveness. Managing productivity improvement is an important and challenging task. Because resource availability and work demands constantly vary, you may never be able to do a perfect job everytime. Because of this, you are continually presented with new opportunities to do a better job.

What Affects Productivity?

Just about everything affects productivity. That's why it is so difficult to measure or even to define clearly. The general factors that affect productivity are:

a. Labor. The most basic productivity factor on every base and in every services organization is people. The labor force contains a mix of abilities, skills, experience, knowledge, education, training, and aptitude. It is this mix of labor that must take the other inputs and produce the desired output. Normal turnover, regular training and job experience constantly change this mix. Personnel policies controlling advancements, assignments, records and penalties create a blend of incentives for labor to use their skills productively. One further variable — motivation — underlies each worker's performance. Motivation is affected by the quality of leadership, by such on-job factors as individual fulfillment, personal recognition and the overall support present in the working environment, and such off-job factors as base living conditions and opportunities to use leisure time effectively.

b. Technology. Effective use of labor skills requires proper tools and equipment. New foods, equipment, and methods also contribute to labor efficiency. The level of technology employed must be appropriate to the task at hand; dollar costs and skills needed to use the technology should not exceed the value of the job itself.

c. Planning. The planning and scheduling of each task, whether merchandising a menu for a special meal or designing a new schedule for billeting, can profoundly affect overall organization productivity. One ill-conceived requirement can squander precious resources. Menu planning, advance ordering, progressive cooking, use of standard recipes, hours of service, and sanitation methods all affect productivity. Careful planning using local performance standards can create the proper conditions for using limited resources as efficiently as possible.

d. Physical Environment. Such conditions as location, temperature, weather, light, and noise affect the efficiency of people and equipment. These physical factors usually assume importance only when they detract from productivity, yet the physical environment (both living and working conditions) can sometimes provide unique opportunities to use more effective designs

and more efficient methods and equipment to enhance productivity.

e. Regulations. The rules and regulations under base services must function also affect productivity. Such regulations, as those spelled out in sanitation and food handling requirements, aim to prevent foodborne illness. Safety and fire protection rules seek to protect Air Force people and physical resources. Other Air Force regulations provide for standard management policies and rules necessary to implement Federal laws regarding use of funds or DOD guidance to standardize methods of operation. Because the inherent inflexibility of most rules and regulations does not allow you to bend them to fit immediate situations, an abundance may cause productivity to suffer.

f. Off-Job Environment. Unlike private industry, much of the air base labor force lives on base in a type of company controlled community. This requires attention to off-job as well as on-job factors that affect productivity. Such factors as family and unaccompanied personnel housing, recreation facilities, shopping, services and community functions play in important role in shaping the attitudes of military personnel toward their jobs.

g. Management. The base chief of services and supervisory personnel exert varying degrees of control over the factors that affect productivity. Management has much control over such factors as menu planning, personnel scheduling, use of leftovers and hours of service. On the other hand, management has little, if any, control over customer preferences, regulations, equipment and manpower authorizations, and the commander's priorities. Management can positively influence productivity if it exercises control over these factors which it can affect. After all, it is the exercise of sound management practices and principles that will have the greatest impact on productivity improvement.

To fulfill the services charter is to define the legitimate customers and needs and then tailor facilities, operating hours, product and service availability, and quality of support to meet those needs. Meeting those needs should result in high levels of customer satisfaction and positive comments from customers. This is often the best indicator of the qualitative aspects of services productivity.

This article has been presented in explanation form with suggested actions to consider to improve productivity. It focuses on factors which affect the quality or quantity of the labor input since the workforce has the greatest impact on productivity. Each air base and every services organization is different. While the suggestions that affect productivity may apply to every base, the relative importance of those suggestions and the ability to control them are bound to be different. This approach does not pretend to give you the answers, but it can help you find the answers by sharpening your thinking about productivity. The conclusions you reach after considering all suggestions should be your own.

Suggested Actions to Improve Service Productivity

1. Thoroughly introduce new personnel to the work of their section.
2. Explain how an individual's job relates to their jobs and how that job contributes to the section's mission.
3. Explain how a section's mission relates to the overall organization and base mission and how that section contributes.
4. Develop training plans for new trainees that provide exposure and training to all facets of his or her AFSC.
5. Carefully monitor new personnel's initial assignments and review their progress with them.
6. Meet frequently with supervisors to discuss complaints and solve problems. Focus discussion what is done that adversely affects people in accomplishing their job and what is done that has a positive effect on job completion.
7. Recognize people who perform in an outstanding manner.
8. Be sensitive to possible labor problems and resolve them before they become a major issue.
9. Take strong, consistent action against idleness on the job.
10. Develop an air of mutual cooperation between supervisors and subordinates.
    a. Keep subordinates informed of what is going on.
    b. Give subordinates more respect in dealing with them.
11. Managers and supervisors should constantly seek to improve communications skills.
12. When correcting employee' mistakes, do so in a constructive manner.
13. Do not wait until things go wrong to communicate with your employees.
14. Be ready and willing to recognize good performance at the time it takes place.
15. Be familiar with employees' particular job talents in order to assign them to the most suitable job function or identify a special need.
16. Actively seek customer comments to identify an operation's strengths and weaknesses. Identify special customers to provide frequent personal feedback.
17. Evaluate what people do and how they do it to see if there are wasted steps or a better way to do it.
18. Make sure job descriptions are realistic.
19. Do not procastinate in your job nor allow employees to put off what they need to do today.
20. Write down things you think of that can improve efficiency or effectiveness at the time you think of it. Take action.
21. Solicit and write down employees recommendations for job performance improvement. Take action.
22. Make certain slow periods are productive periods.
23. Encourage employees to ask questions when instructions are given.
24. Take proper care of equipment and insure periodic user maintenance is performed.
25. Instruct employees to report needed equipment repairs immediately.
26. Make sure required tools, equipment and supplies are available to perform jobs.
27. Establish an employee feedback system on availablility of necessary tools, equipment and supplies.
28. Supervisors and managers should provide the quality control on all jobs to make sure all standards, methods and procedures set for the job are followed.
29. Enforce consistent discipline within the organization
30. Conduct exit 'interviews with all departing employees.
31. Take a personal interest in a new worker's progress and personal affairs.
32. Take action to discourage absenteeism among employees.
33. Solicit workers input on appropriate problem resolution.

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A simple-to-use technical management tool to serve as a road map...

ECOP

by Maj. Dick Cardinale

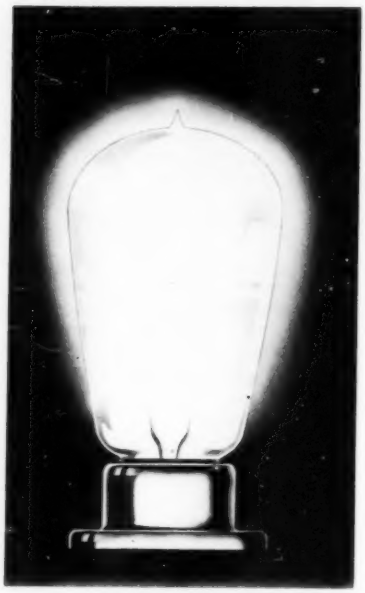
The Energy Conservation Opportunity Program (ECOP) offers a solution to the time consuming task of building energy technical surveys and analyses. An ECOP survey and analysis can take as little as two hours for 800 family housing units; a building loads analysis and system thermodynamics (BLAST) survey and analysis could take months. Nearly 100 bases have used ECOP over the past year. The results produced $60 million in energy retrofit requirements, two-thirds with an estimated simple payback under five years. The best $5 million worth of projects were approved for immediate accomplishment with FY82 Family Housing Improvement (P-713) funds. This means NOW dollar savings in our utility budgets! This article focuses on the need for, the development of, and the results obtained from ECOP-I: energy retrofit analysis for family housing. The same concerns exist on energy retrofit analysis for our industrial buildings. ECOP-II is under development by AFESC to help solve this problem.

A Conscience Decision

Picture two separate engineering consciences, one on each shoulder. On your left shoulder the technical conscience strives for detailed study and analysis, ***state of the art*** concepts, and "gnat's hair" precision. On your right shoulder the managerial conscience strives for quick studies and analysis, effective concepts, and "ball park" precision. Our engineers have been caught in this dichotomy since we began a concentrated effort on building energy technical surveys seven years ago.

Executive Order 12003 (Relating to Energy Policy and Conservation) as well as the National Energy Conservation Policy Act (Public Law 95-619) provide the direction to accomplish energy surveys. At the start of our energy survey program, we faced a work load of nearly 100,000 Air Force-owned buildings over 1,000 square foot in size (including family housing) that had to be surveyed and retrofitted by 1990. We approached the job with all the technical audacity we could muster.

In the first six years of our efforts we completed energy surveys on 15 percent of our industrial buildings and six percent of our family housing stock. The technical



conscience would support that we studied and analyzed our buildings in great detail to optimize their energy performance. But, the managerial conscience would logically respond with, "It'll take 32 years to complete the job if we continue at the same rate. We'll miss compliance with public law by 21 years."

Recognize the Problem

We recognized the survey and analysis problem that faced our engineers. It was time for a change, leaning more toward our managerial conscience, applying the lessons learned in six years of survey and energy retrofits.

Looking forward from 1981 we had more than 28,000 industrial buildings and 130,000 family housing units to survey. Although the work load didn't present a particularly comfortable outlook, the potential energy and dollar avoidance from retrofit investments was promising. We chose to go after the family housing problem first; it had the wider application and the better probability of quick returns.

Air Force family housing consumes 22 percent of our facility energy. By FY84 we expect the annual energy bill to exceed $200 million. Estimates on potential reduction through retrofit construction in family housing vary between 10 and 30 percent. Therefore, on the low end we stand to save $20 million per-year as a result of retrofits.

The Housing Opportunity

We perceived a need for a simple-to-use technical management tool to serve as a road map to good energy retrofit projects in family housing. Engineers at our bases were looking for opportunities that could work at their locations. MAJCOM managers were looking for ways to project future dollar requirements for family housing retrofit investments. And, the Air Staff wanted to know how much more money was needed to achieve a good energy posture in family housing.

In September 1981 the Air Force entered into a tri-service venture to develop and implement an Energy Conservation Opportunity Program (ECOP) for family housing.

The Navy had been working with a Washington, D.C.-based consultant firm (JRB Associates) on a computer-based model to assemble a uniform inventory of family housing units and calculate energy use and potential savings. The original model, Worldwide Housing Energy (WHEN), used standard American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) formulas coupled with rules of thumb about military family housing units. The standard ASHRAE formulas represented the technical concerns. The rules of thumb recognized the managerial concerns. The partially developed WHEN model formed the basis of ECOP.

ECOP Goals

Our goal was to create a one-page data input sheet and corresponding one-page ***clear language*** data output sheet. We aimed dead center between the technical and managerial concerns. On the technical side our engineers had to input building envelope characteristics, mechanical and electrical system codes, climate data, actual energy consumption, and actual energy costs.

On the managerial side, representative sampling was encouraged for envelope and system inputs. (Building orientation and minor differences among individual units

would be discounted.) The total estimated time to complete an ECOP input sheet, including site sampling, was estimated at two hours.

Although ECOP was a tri-service venture the Air Force's goal for field implementation was at least six months ahead of the other services. Therefore, we took the lead in resolving simulation and execution problems with the program.

Implementation

ECOP was introduced to the MAJCOMs in January 1982 with copies of the draft data input sheet, instructions, and output format. The drafts were finalized in February 1982 and released for Air Force use. The one-page data input sheet (Figure 1) consisted of six categories of information—location, weather, energy using systems, housing unit description, exterior surface description, and fuel consumption data. AFESC pre-coded from available data items such as city, state, station codes, heating degree days, cooling degree days, langleys, and exterior design temperature.

Since we were the lead on ECOP implementation, we experienced the input/output, coding errors, and malfunctions inherent in any computer-based tool. But, with the excellent cooperation of those engineers and MAJCOMs who had participated early in the cycle, we worked the bugs out. Revised ECOP output products were delivered to 74 bases and their respective seven MAJCOMs in June 1982 to serve as a basis of their FY84 energy investment programs.

The one-page data output sheet (Figure 2), consisted of a plain language recap of the input data, an estimate of the energy used per square foot and how it was used (hot water, space heat, appliances, etc.), the projected 1984 fuel rates, and most important, the results of calculations on 19 standard energy conservation opportunities. For each standard opportunity the following information was displayed: Energy savings, project cost, annual dollar savings, energy-to-cost ratio, benefit to-cost ratio, and simple payback.

Results

Although ECOP was offered as an optional energy analysis tool it has been used successfully on 65 percent of our housing stock. The Air Force, by using ECOP, has increased its building energy technical surveys of family housing from six to 71 percent during FY82. Over the next few months we expect to see analyses completed on most, if not all, of the remaining housing stock.

As a useful tool to our engineers, ECOP met its goal. But, it's the application of the results that are impressive. ECOP helped to identify nearly $60 million of family housing retrofit investments, two-thirds of which carry an estimated simple payback of less than five years. Within four months of project submittals by the MAJCOMs in August 1982, the best $5 million of investments were approved for funding in the FY82 program. Nearly every base that participated in ECOP had at least one project approved within the $5 million.

Positive Feedback

The average estimated simple payback on the $5 million investment was one year.

By using ECOP our base and MAJCOM engineers' efforts over a one-year period will result in a $5 million-per-year cost avoidance in our family housing energy bill within the next year.

PAGE 42

N1003 FAMILY HOUSING ENERGY CONSERVATION OPPORTUNITY PROGRAM N1003

LOCATION

THE LOCATION IS BEDFORD , MA
THE INSTALLATION (UIC) CODE IS FAXXXO
THIS IS PROJECT #1003, DESCRIBED AS :
NEW-NEW COMPLEX 100 UNITS

HOUSING AREA INFORMATION

THIS PROJECT HAS 100 UNITS OF 50-69 HOUSING CATEGORY CODE 711143 .
8 UNITS ARE SINGLE FAMILY HOMES
0 UNITS ARE DUPLEX HOMES
92 UNITS ARE TOWNHOUSES, AND
0 UNITS ARE APARTMENTS,
OF THE TOTAL UNITS IN THIS ACTIVITY:
26. PERCENT ARE SINGLE STORY HIGH
74. PERCENT ARE TWO STORIES HIGH
0. PERCENT ARE OVER TWO STORIES
THESE UNITS ARE IN ACOUSTIC NOISE ZONE 1
THIS PROJECT AREA TYPICALLY ACCOMODATES 550 OCCUPANTS.

AREA COST FACTOR = 1.02

CLIMATE DATA

THERE ARE 6474 HEATING DEGREE DAYS PER YEAR
AND 591 COOLING DEGREE DAYS PER YEAR
THE EXTERIOR HEATING DESIGN TEMP. IS 3 F.
THE GROUND-WATER TEMPERATURE IS 50 F, IN THE SUMMER AND 50 F, IN THE WINTER.
THE INSULATION AVERAGES 311 LANGLEYS DAILY.

MECHANICAL SYSTEMS

HEATING FUEL IS GAS USING A BOILER
HAS SPARK IGNITION AND NO FLUE DAMPER
THERMOSTAT TYPE IS CLOCKSETBK
NO MASTER METER AND NO INDIVIDUAL METERS

COOLING FUEL IS ELEC USING A WINDOW A/C
NO RADIO CONTROL OR ENERGY MGMT. SYSTEM

D.H.W. FUEL IS GAS USING A WATER TANK
HAS SPARK IGNITION AND NO FLUE DAMPER
NO TANK JACKET AND NO RADIO CONTROL OR ENERGY MGMT, HAS SHOWER FLOW RESTRICTOR.

NO AREA MASTER ELECTRIC METER, NO INDIVIDUAL METERS.

NO FLUORESCENT LIGHTING (H&K).

UNIT ENVELOPE

ROOF: THE ROOF TYPE IS BU RAFTR PLASTR
EXTERIOR 0.25 IN. OF ASPHALT FELT
MIDDLE 0.50 IN. OF SHEATHING (EXT)
MIDDLE 3.00 IN. OF BATT INSULATION
MIDDLE 0.00 IN. OF
INTERIOR 0.75 IN. OF GYPSUM BOARD
U-VALUE = 0.09 , UA-VALUE = .82E+02
HAS ATTIC, ROOF REFLECTANCE IS LIGHT

WALL: THE WALL REFLECTANCE IS LIGHT
EXTERIOR 0.75 IN. OF PLYWOOD SIDING
MIDDLE 1.50 IN. OF AIR SPACE (INS)
MIDDLE 1.50 IN. OF BATT INSULATION
MIDDLE 0.00 IN. OF
INTERIOR 0.75 IN. OF GYPSUM BOARD
U-VALUE = 0.11 , UA-VALUE = .11E+03

GLASS: THE AVG. GLASS AREA IS 130 SQ.FT.
WINDOW HAS DOUBLE GLZ , W/
U-VALUE = 0.50 , UA-VALUE = .65E+02
HAS ADEQUATE WEATHERSTRIPPING

FLOOR: THE AVG. GROSS AREA IS 1468 SQ.FT
INSULATION = 6.00 IN. OF SOLID CONCRET
U-VALUE = 0.32 , UA-VALUE = .29E+03
NO BASEMENT AND NO CRAWL SPACE

ENERGY CONSERVATION ANALYSIS

ENERGY CONSERVATION OPPORTUNITY	MEGABTU USED	MEGABTU SAVED	EST.COST $ (1984)	1ST.YR $SAVED	E/C RATIO	B/C RATIO	PAYBK (YRS)
(EXISTING HOUSING)	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
ADD R=11. TO ROOF	.20E+05	.73E+03	.42E+05	.53E+04	17.0	2.5	8.0
WALL INSULATION	.21E+05	.52E+03	.55E+05	.38E+04	9.1	1.3	15.0
WINDOW REPLACEMENT	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
STORM WINDOWS	.21E+05	.69E+03	.67E+05	.49E+04	9.8	1.5	14.0
INSULATE CRAWL SPACE	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
WINDOW INSULATION	.20E+05	.17E+04	.84E+05	.12E+05	19.0	1.9	6.9
DHW TANK INSULATION	.21E+05	.41E+03	.39E+04	.30E+04	100.0	10.0	1.3
RESTRICT SHOWER FLOW	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
FLUE DAMPER - HEATING	.20E+05	.10E+04	.16E+05	.73E+04	61.0	9.1	2.2
SPARK IGNITR-HEATING	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
SOLAR WINDOW COATING	.21E+05	.13E+03	.36E+05	.11E+04	3.6	0.6	30.0
SOLAR SHADING DEVICE	.21E+05	.16E+03	.86E+05	.15E+04	1.9	0.3	58.0
SETBACK THERMOSTAT	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
USE DHW HEAT PUMP	.21E+05	.72E+02	.91E+05	-.23E+03	0.8	-0.0	< 0.0
SOLAR HOT WATER HEAT	.20E+05	.91E+03	.50E+06	.86E+04	1.8	0.3	76.0
HEAT PUMP SPACE HEAT	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
RELAMP W/FLUOR (H&K)	.20E+05	.74E+03	.17E+05	.66E+04	43.0	7.1	2.5
A/C HEAT RECOVERY	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0
HEAT WITH GAS FUEL	.21E+05	.00E+00	.00E+00	.00E+00	0.0	0.0	0.0

BUILDING LOADS (KBTU/SQ.FT-YR)

UNIT TYPE	SPACE HEAT	SPACE COOL	D.HOT WATER	LIGHTS &MISC.	INFILT RATION	SUM OF LOADS
1FAM	.7E+05	.7E+04	.2E+05	.5E+05	.1E+05	.16E+06
2FAM	.0E+00	.0E+00	.0E+00	.0E+00	.0E+00	.00E+00
TWHS	.6E+05	.7E+04	.2E+05	.5E+05	.9E+04	.14E+06
APTS	.0E+00	.0E+00	.0E+00	.0E+00	.0E+00	.00E+00

1984 FUEL COST PER MEGABTU BAR SOURCE

ELEC $ 8.90 GAS $ 7.24

ROUTING INFORMATION
MAJCOM/EFD: AFSC
SEND REPORT TO:
BCE
HANSCOM AFB , MA 01731
( ) 478-2166
41003

Figure 2

Future Applications

A good potential exists for ECOP-Phase II. We have 28,000 industrial buildings left to survey in the Air Force. With the same approach as used in family housing, ECOP-II can help identify good retrofit investment projects in a minimum amount of time to save energy and utility dollars. AFESC is working on the ECOP-II concept now and expects to have a product available for use within the next nine months.

Maj. Dick Cardinale is currently the Energy Conservation Investment Program (ECIP) manager with the Energy Group at HQ AFESC. He earned a bachelor of science degree in Management Engineering at Newark College of Engineering in 1969 and his master's in Management Engineering with the AFIT School of Systems and Logistics in 1977. He arrived at AFESC following a tour with Eastman Kodak, Rochester, N.Y., through the AFIT EWI Facility Energy Management Program. His previous assignments have included Goodfellow AFB, Texas; Wakkanai AB and Misawa AB, Japan; Kwang Ju AB, Korea; and Headquarters Tactical Air Command, Langley AFB, VA.

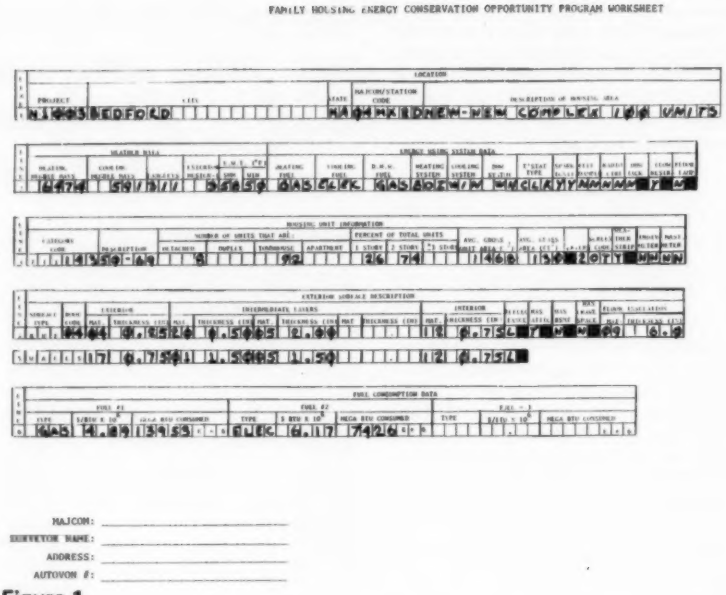


Figure 1

ARE YOU GETTING FULL VALUE?

by Harry R. Marien

If you bought a new car and less than a year later found the engine required a major overhaul, you'd feel cheated or at the least upset that you hadn't gotten full value for your money. Yet the Air Force has roofing systems which are supposed to last 20 years, but fail in three to five years. As stewards of the taxpayer's dollars, we in the Air Force have the responsibility for insuring that the Air Force gets full value for the construction money it spends.

Faced with a $2500 bill for an engine overhaul on a new car, the owner would beat a fast track to the car dealership, the factory representative, consumer affairs counsel, a lawyer and anyone else that would listen in an effort to reduce or eliminate the loss. We can't do less for the Air Force on our roofing projects.

Fortunately the Air Force has made our job easy by providing legal and procurement staffs to assist in our efforts to get full value from construction contract dollars. AFM 91-36, Built Up Roof Management Program, was developed to provide methods and standards that engineers and architects can use to assure quality roofing. The master specification in AFM 91-36 was tailored to suit 90 percent of Air Force reroofing projects. With minor changes the specification is also appropriate for use on new construction. In the specification are requirements to assure the Air Force that the roofing contractor is responsive:

- Through certifications from a Built Up Roof System (BURS) manufacturer,
- Assignment of a quality controller and
- Acceptance of a performance agreement to repair roof leaks for five years.

The contractor is responsible for the application of a 20-year type roof system and is responsible for the quality control during application. The Air Force conducts a quality assurance program to verify that the contractor's quality control system works and audits his performance through roof samples that are analyzed by an independent laboratory. By following procedures in AFM 91-36, the Air Force has the documentation at the completion of the contract to prove whether or not the roof installation conforms with the specification. If AFM 91-36 is not used, the Air Force does not get full value for its roofing project dollar.

Persistance pays off. In the case of the new car owner, the car dealership traded him even for a new car. For the Air Force improved roof quality has been achieved as shown by analysis of samples from a number of roofs. In one case where the contractor did not comply with the specifications he reduced his contract price by one half and agreed to maintain the roof leak free for 10 years when confronted with Air Force evidence. AFM 91-36 does help insure full value on your roofing projects; understand and use it.

tecnotes

FIRE PROTECTION — T.O. 00-25-172, Ground Servicing of Aircraft and Static Grounding/Bonding, Dec. 2, 1982, should have been distributed to fire departments which have a crash rescue mission. The new technical order for the first time lists the standby requirements for the fire department when hazardous operations are occurring on the flight line. (AFESC/DEF, Capt. Ray, AUTOVON 970-6154)

AUTOMATED FOOD SERVICE OPERATIONS SYSTEM (AFSOS) — The six month prototype test at Seymour-Johnson AFB, N.C., was completed Feb. 28. The system tested was a microcomputer featuring real time processing in seven different modules. Air Force-wide implementation for 122 bases is planned for FY 84-86. Seven bases are planned to implement in FY 84. (AFESC/DEHFO, Capt. Rea, AUTOVON 970-6199)

SAFETY IS A KEY FEATURE of a new aluminum or fiberglass ladder system made by Little Giant Industries, and available on the GSA schedule. Flared legs, skid resistance and improved stability are key advantages. Fiberglass models offer safety for people working on or near electrical systems. Units can be made into A-frames, adjustable extension, staircase or scaffolding trestles. A 5'7" basic unit replaces 5-, 6-, 7-, 8- and 9-foot ladders. Ordering information is below:

N S N	NOMENCLATURE
5440-01-049-3398	Ladder, Adjustable, 13'
5440-01-048-8638	Ladder, Adjustable, 17'
5440-01-092-1894	Ladder, Adjustable, 22'
5440-01-092-1812	Work Platform
5440-01-143-7010	Ladder, Adjustable, 15' (Fiberglass)
5440-01-143-7011	Ladder, Adjustable, 19' (Fiberglass)

"This ladder appears to be well worth considering for future ladder needs with respect to both safety and efficiency," said the ***USAF Safety Journal.*** (AFESC/DEMM, Mr. Reeve, AUTOVON 970-6346)

SOLAR HOT WATER SYSTEMS — Several of our solar hot water systems are undergoing site analysis by the Los Alamos National Laboratory. Early observations indicate a lack of preventative O&M which in two instances caused complete system shutdown. A few hours a month can prevent this and even extend the system's life two-fold. As a minimum, you should check the solar loop fluid level, pump operation, sensor integrity and differential controller logic. In addition, twice a year you should check the fluid pH and the operations of the freeze and high temperature thermostats, if appropriate. LANL also recommends using a 50/50 mixture of inhibited propylene glycol (e.g., DOWFROST) rather than the more toxic military-grade inhibited ethylene glycol. These tips plus many others will be published by AFESC/DEB early in 1984 in a ***Solar Operations and Maintenance Procedures Handbook.*** (HQ AFESC/DEB, Bruce MacDonald, AUTOVON 970-6452)

AIRCRAFT TAILHOOK AND BARRIER CABLE — Surface wear tests will be conducted at the Naval Air Engineering Center, Lakehurst, N.J., to develop criteria for operating aircraft arresting systems on unconventional surfaces. The effects of an F-4 tailhook sliding into an AM-2 ramp will be studied to determine if current anchoring methods are adequate when AM-2 is used for a repaired crater cover. Other tests to be conducted include tailhook response when operating on a soil surface, and the survivability of various materials when subjected to repeated barrier cable impacts. (HQ AFESC/RDCR, Capt. Wallington, AUTOVON 970-6307)

Winners

By H. Perry Sullivan Jr., Editor

The best of Air Force Civil Engineering was honored Feb. 25 at the Air Force-sponsored luncheon culminating National Engineers Week.

Gen. Russell E. Dougherty (USAF Ret.) and Maj. Gen. Clifton D. Wright, Jr., Air Force Director of Engineering and Services, presented the awards.

General Dougherty, former Commander-in-Chief, Stratigic Air Command, now executive director of the Air Force Association, presented the Maj. Gen. A.M. Minton Award for the ***Quarterly's*** best article to SMSgt. (CMSgt.-selectee) Arthur Hanrahan, 7002nd CEF, Ramstein AB, Germany (USAFE), and MSgt. Peter Engels, 3rd Combat Communications Group, Tinker AFB, Okla. (AFCC).

Sponsored by the AFA's Aerospace Education Foundation, the award is annually presented to the authors of an article selected by the AFA from nominations submitted by the Air Force. Sergeants Hanrahan and Engels authored "Hands-on Training: The Need Has Never Been Greater," which appeared in the Fall, 1982, issue. They are the first NCO winners of the award.

General Wright presented awards honoring:

- Willi Divivier, 86 CES, Ramstein AB, civil engineering civilian manager of the year up to grade GS-11.
- George E. Adams, 52 CES, Spangdahlem AB, Germany (USAFE), CE civilian manager of the year above GS-11.
- Maj. Philip R. Celner III, 91 CES, Osan AB, Korea (PACAF), military CE meritorious achievement award.
- Jonathan P. Miller, 3415 CES, Lowry AFB, Colo. (ATC), CE civilian meritorious achievement award.

RIGHT: Gen Russell E. Dougherty, LEFT: SMSgt. (CMSgt selectee) Arthur Hanrahan.

RIGHT :Brig. Gen. Sheldon J. Lustig, LEFT: MSgt Peter Engels

LEFT: Maj. Philip R. Celner III, RIGHT: Jonathan P. Miller SMSgt Patrick McAllister

- TSgt. Freddie Thompson Jr., 4372nd CES, Vandenberg AFB, Calif. (SAC), CE NCO of the year (Sgt.-TSgt.).
- SMSgt. Patrick McAllister, 84 CES, Ramstein AB (USAFE), CE NCO of the Year (MSgt.-CMSgt.).
- 42 CES, Loring AFB, Me. (SAC), outstanding CE unit of the year.
- MSgt. Woodrow F. Giddens, 7002 CEF, Ramstein AB (USAFE), the Goddard award for outstanding enlisted contributions to military construction and/or base maintenance.

Bordner Awards for heating and electrical plants went to:

- Davis-Monthan AFB Ariz. (TAC), best category one heating plant.
- Ramstein AB, Germany (USAFE), best category two heating plant.
- Det. 15, 2140 Com. Group (AFCC), Levkas, Greece, best category one electrical generating plant.
- Vandenberg AFB, Calif. (SAC), best category two electrical generating plant.

Also recognized was Allen Lim, Air Force Regional Civil Engineering Office, Western Region, San Francisco, Calif., who was honored as the Air Force Engineer of the Year by the National society of Professional Engineers the previous night at their honors banquet at Bolling AFB.

Brig. Gen. Sheldon J. Lustig, deputy chief of staff, Engineering and Services, USAFE, was named as winner of this year's Newman Award for outstanding achievements in Air Force civil engineering. The award will be presented at the annual convention of the Society of American Military Engineers in St. Louis April 27-30.

Services awards were presented at the Lowry Technical Training Center during the meeting of the Services Program Review Committee. These will be covered in the summer ***Quarterly***.

◄ **RIGHT: CMSgt Woodrow F. Giddens, LEFT: Allen Lim**

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